THE IRON AGE

New York, April 24, 1924

ESTABLISHED 1855 VOL. 113, No. 17

An All-Metal Airplane Built Almost Entirely of Duralumin

Metals Used in Airplane Construction

Duralumin All-Metal Planes—Carbon and Alloy Steels for Certain Parts—Advantages and Disadvantages Over Wood—Latest Developments

BY LIEUT. F. O. CARROLL*

A BRIEF outline of the present development of metals in the construction of aircraft, especially as applied to airplanes, is the aim of this article. It will briefly cover the advantages and disadvantages of the various metals with their characteristics and properties, their principal uses and examples of their application.

Previous to and up until near the close of the World War, wood was the principal material used for the construction of the main structural members of an airplane. Its selection was due to its comparatively great strength in proportion to its weight, its ability to withstand vibration better than metal, its ease of manufacture and the availability of fairly large quantities of suitable timber. Toward the close of the war, however, the sources of suitable timber were becoming more and more exhausted, due to the enormous numbers of airplanes being built. Airplane designers began to feel the necessity of finding some substitute for wood, and the choice naturally fell to steel and the various metal alloys just coming onto the market.

Advantages of Steel Over Wood

Steel was the first selection, due, no doubt, to the vast experience that all countries have had in its use. It was also selected due to its immediate availability in the forms desired, such as sheets, angles, channels, cables, wires and tubes. Steel has many advantages over wood, some of which are:

With a well controlled process of manufacture, such as the open-hearth, the material may be produced in a practically uniform quality in unlimited quantities.

The chemical composition and hence the physical properties may be accurately controlled.

A supply may be obtained in much less time than is required to give a large supply of suitable timber.

Atmospheric conditions have no effect on the material, such as causing it to warp or check, but care must be taken to prevent corrosion.

There is very little waste in its manufacture.

A variety of methods may be used in making up a structure of steel or other metal.

The physical characteristics of the metal can be changed at will by variations in its composition.

Ordinary structural steel has a tensile strength of about 50,000 lb. per sq. in., and at this strength does not compare favorably with wood on the basis of a strength-weight ratio. But it is possible to increase the strength of ordinary steel by the addition of carbon, and by certain heat-treating processes the resulting material may be increased in tensile strength to as much as 100,000 lb. per sq. in.

The so-called low and medium carbon steels are the ones most extensively used. The former steel is soft enough to permit of its being formed and bent cold without fracturing, and it can be welded and brazed without injuring. Tubing made from soft carbon steel is used in practically all fuselages or any structure that is welded at all points.

One illustration shows an all-steel welded tube fuselage. This total structure is without any pin joints or bolted fittings, each tube being welded to its adjoining members, thus making of the whole a very rigid frame work. Like all airplane structures of this type it does not have to be realined when once set up. Similar structures built of wood and wire, as was formerly the practice, were continually loosing their alinement, due to the stretch of the wires and cables, the pulling of the metal fittings into the wood and also to the frequent warping of the wooden members. The metal airplane is free from all these faults. Further, in crashes the metal frame is much safer than the wooden one. A wooden airplane will splinter and the fire hazard becomes very great, while in the steel one the damage is usually localized, the metal tubes merely crumpling at the points of greatest stress.

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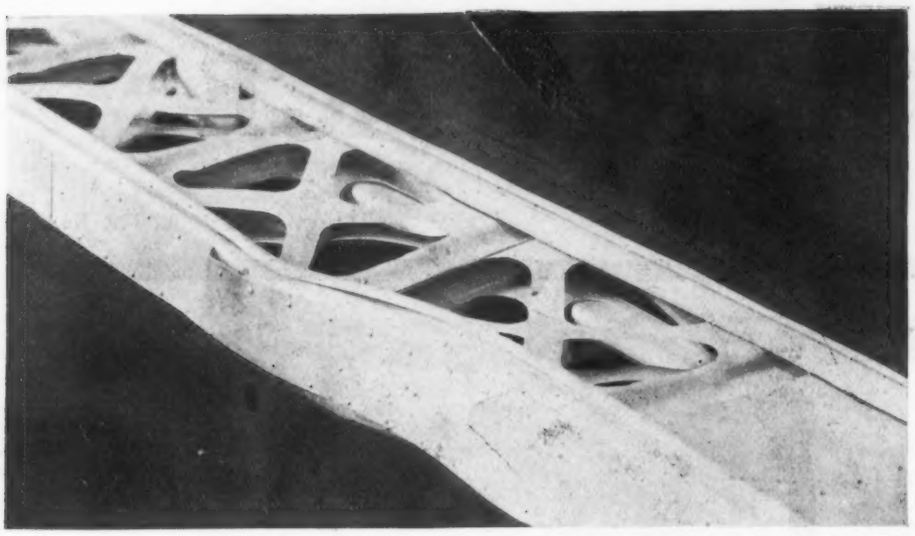


An Airplane Spar Made Entirely of Duralumin. It is constructed of sheets riveted to specially shaped channels

The wing of an airplane is usually built around two parallel beams or spars, which transmit the air loads to the body of the airplane. Usually the beams are of wood, since for equal strength the metal beams are somewhat heavier. The principal difficulty in constructing metal beams is to be able to prevent buckling or crumpling of the very thin metal sections necessary if the weight is to be kept down.

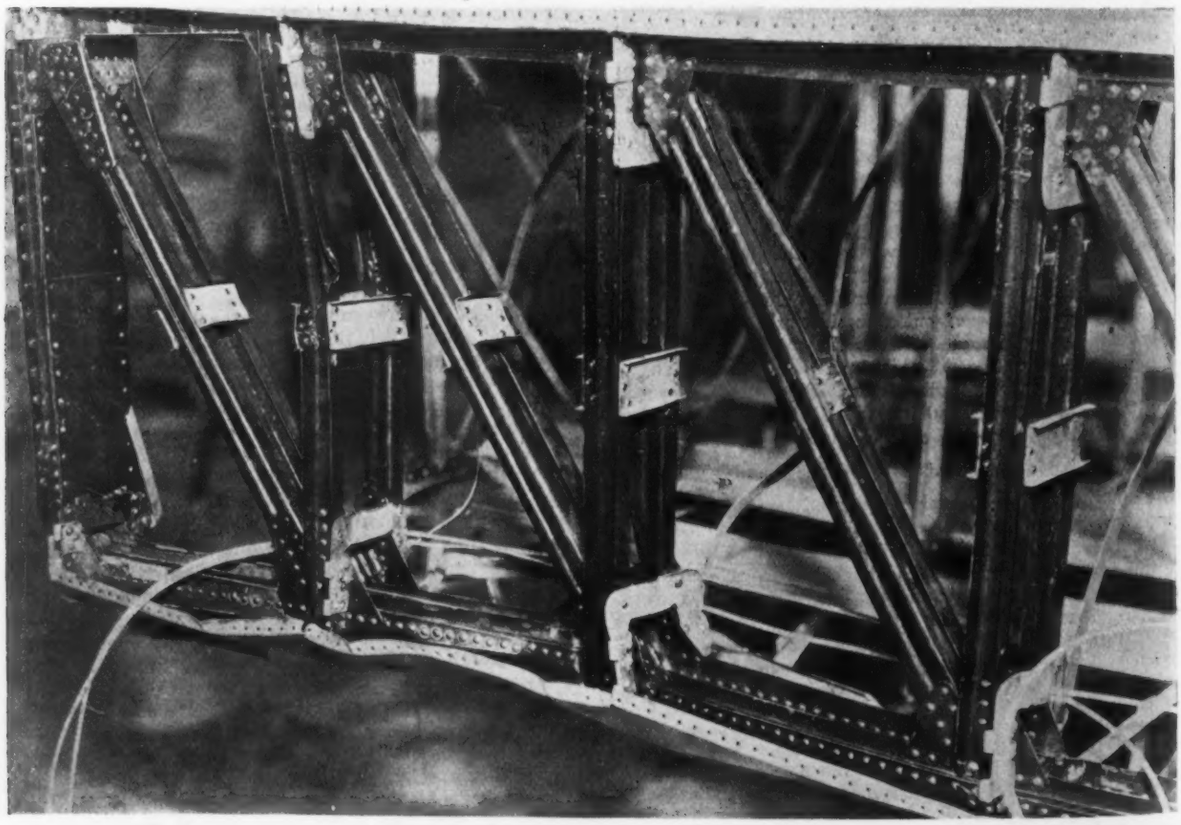
Spars of Steel

An example of a steel spar built up of very thin sections is given by another illustration. A typical failure in this type of construction is that due to the buckling of the thin members in compression. The construction of an all-metal wing having three metal steel tubular spars is shown in one of the illustrations. Each spar consists of an upper and lower chord member and several vertical spacers. All joints are pin-ended and the spar is made a rigid structure by the use of flat cold-rolled steel wire. This type of spar is used when the wing is very deep compared to its width.

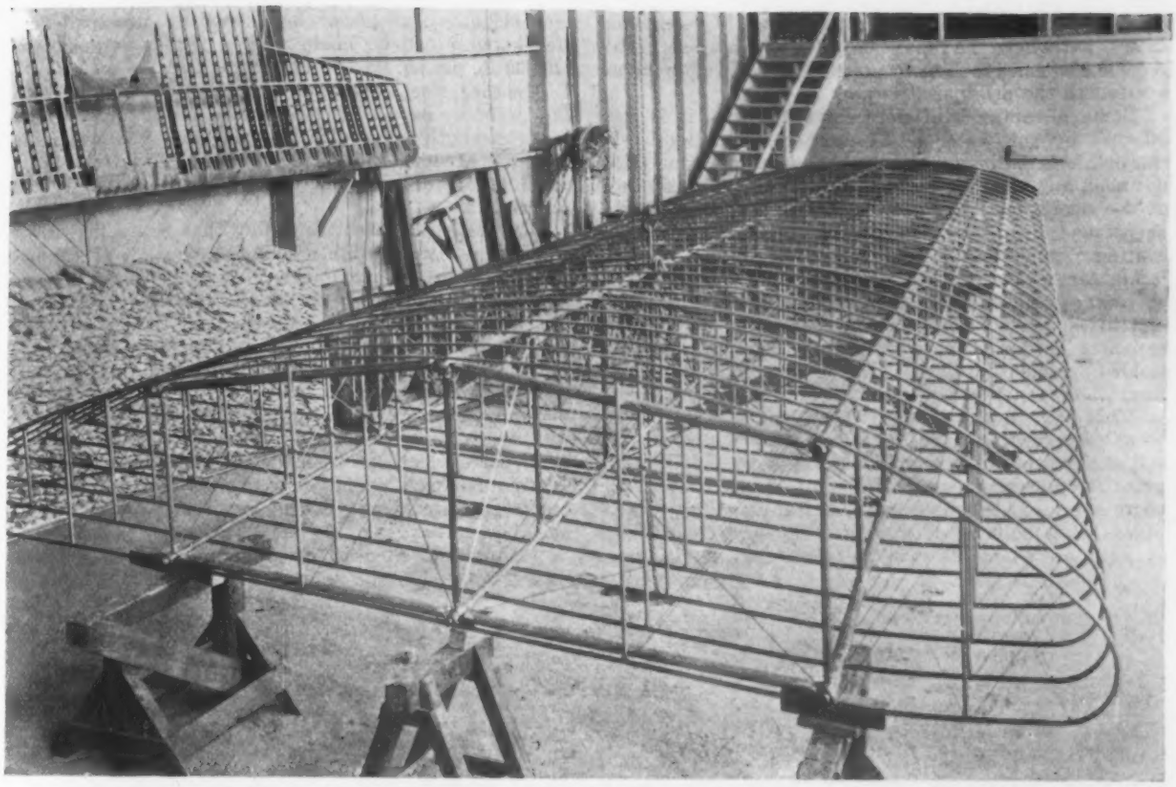
Efficient steel spar construction has not yet reached that stage where it compares favorably with wooden beams on a weight basis. The steel spar, to develop the required factors of safety, is still very heavy. The principal difficulty in the construction of steel spars seems to be the securing of a proper distribution of the metal in the flanges to prevent failure by buckling of the thin sections or its tearing at rivet holes. In the case of steel tubular spars they are also very heavy compared to the wooden spar for all the wings in common use today, due to their lack of thickness.

Many other parts of the airplane lend themselves readily to steel tubular construction, and especially is this true of the tail surfaces. These surfaces usually have rounded edges which permit of the bending of the steel tubes to the required shape, thus obtaining very efficient and pleasing contours. In horizontal stabilizers, constructed of steel tubes all welded at their points of contact, the outside tubes are wrapped with cloth to which the fabric covering is sewed.

Practically all the principal fittings used in the air-



A Steel Spar for an Airplane Built up of Very Thin Sections



An All-Metal Wing Having Three Steel Tubular Spars, Each Spar Consisting of an Upper and Lower Chord Member and Several Vertical Spacers

plane are made of steel. Some of the fittings may be quite complicated where they form the junction point of several members, as for instance at the end of a wing strut, where several wires are attached. Fittings at such points are usually made from sheet stock to which may be welded or riveted and brazed other parts which may be machined from bar stock.

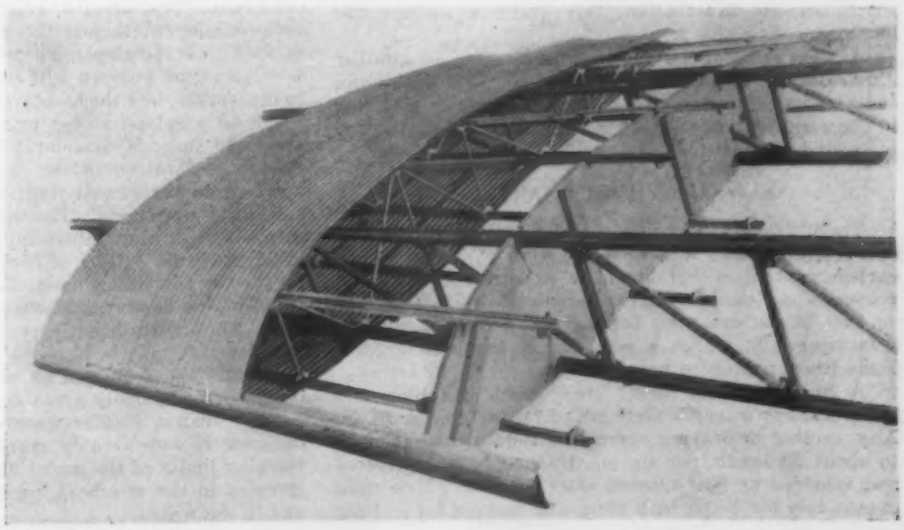
The pioneer aircraft builder used piano wire almost exclusively for bracing and control wires. The introduction of the more reliable woven and stranded steel cables replaced these, but for internal wing and fuselage bracing swaged rods are also used. For further refinement in airplane performance cold-rolled solid streamline wires were introduced for wing and chassis bracing. This wire has the disadvantage that it gives no warning of incipient failure, as does a cable, but with present-day methods of manufacture it is proving very reliable.

Use of Duralumin

The next great advance in metal construction came with the introduction of duralumin, as it is more commonly known. This is an alloy of aluminum containing about 4 per cent of copper and very small amounts of other metals. This alloy opened up large possibilities in the construction of very light but strong structures, since its weight is only about four-tenths that of steel and it possesses a tensile strength of about 55,000 lb. per sq. in. This metal may be heat-treated. It possesses the peculiar properties of increasing in strength and hardness with age. It is rather difficult to work except in the soft or annealed condition, and in general this condition lasts for only a few hours.

This peculiar feature of duralumin not hardening immediately after quenching is taken advantage of in forming many parts from it while in this state. In fact, all thin channel and angle sections are annealed, then rolled, and require no further treatment than to cure in the air from five to seven days. The hardness and strength may also be increased by boiling in water for several days, although this is not the common practice.

Duralumin is not suitable for structural members, such as certain fittings, that take alternate repeated



Corrugated Sheets of Duralumin Used as Coverings for Wings and Fuselages

stress, such as caused by vibration, since investigation shows that where the repetitions of stress have occurred 100,000,000 times the tensile strength is reduced to about one-fourth the original strength.

Some advantages of duralumin are that it is not affected by salt-water or atmospheric conditions. It can be tempered or annealed in a few minutes and does not need any cleaning, sand blasting or pickling in any of the operations it is put through, always remaining bright and clean, and requiring little if any protective coating. Sometimes a light varnish is applied. Duralumin can be machined easily and rapidly and is free cutting. It can be rolled into sheets, drawn into tubing and wire and extruded into heavy sections or bars. It can also be forged into intricate shapes. It can be welded by using duralumin wire or strips and aluminum flux. However, it must be tempered after welding.

This alloy has been used mostly in such forms as wing ribs, cowling, cartridge boxes and chutes, ribs in tail surfaces and many smaller parts and fittings where great strength is not of primary importance. However, there are many examples of practically the entire airplane being built of duralumin. The first illustration is such an example. This airplane has a fuselage, known as the monocoque type, which is constructed over a form or jig. The bulkheads which maintain the form of the finished body are assembled in the jig and the duralumin strips or sheets are riveted to them. The longitudinal U-shaped members along the sides are riveted over the sheets to add strength and stiffness to the structure. The wings are constructed by assembling the duralumin spars and ribs in proper position and onto these are riveted the metal sheets.

When duralumin is used for wing and fuselage coverings, as in this example, it is necessary to use very thin sheets of about 0.020 in. or less in thickness. When applying these sheets extreme care must be exercised in riveting or the covering will be torn away from the rivets very easily. The sheets used on this particular airplane were plain flat stock. Quite often the sheets, when used in this manner, are corrugated, as shown in one illustration, this being a method for increasing its rigidity.

An example of an all-duralumin spar is another illustration. This spar is constructed of duralumin sheets riveted to specially shaped channels. It failed in the compression member by the buckling of the top plate and channels.

Other Alloys Used in Airplanes

There are several other metal alloys used to fabricate certain parts and fittings. One of these, a low carbon content nickel steel, is extensively used. It possesses a tensile strength of about 100,000 lb. per sq. in. It can easily be formed and bent cold without fracturing. It is not a good metal for welding, but lends itself readily to brazing.

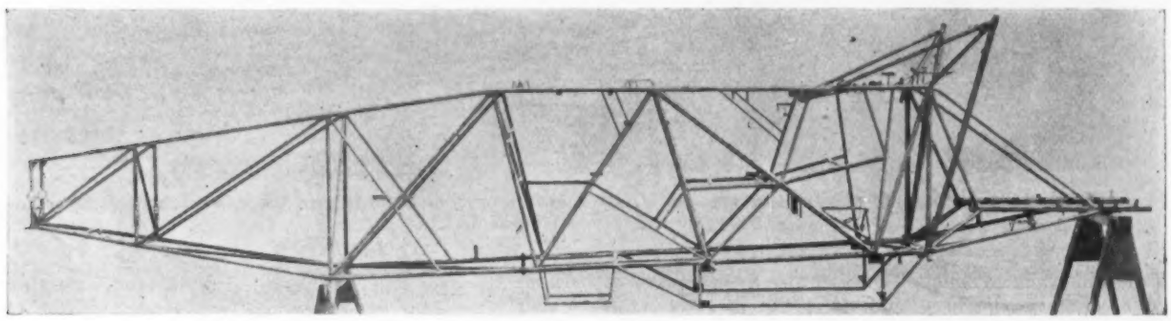
A higher carbon nickel steel, used in tubing and bar stock, has a tensile strength of 110,000 lb. per sq. in. Any welding or brazing operations reduce this strength to about 80,000 lb. per sq. in. Ordinarily, it is riveted and soldered or heat-treated after brazing. It is used extensively for bolts, both plain and fork ended and for turnbuckles. By special heat treating process some nickel steels can be made with a tensile strength of 240,000 lb. per sq. in.

Another steel, known as chromium-vanadium steel, will probably be used in the future for fittings, where great strength is required. This steel has a tensile strength of 160,000 to 170,000 lb. per sq. in. It is suitable for forming and bending and can be welded and brazed.

Manganese bronze is an alloy that is finding favor in airplane construction. This is an alloy of copper, zinc, tin, iron and manganese. It can be cast in very thin sections and it is one of the few alloys that can be used in cast form as an important fitting. It is a good material for pontoons and flying boat fittings, as it is not affected by salt water, but it should not be used in contact with steel bolts due to the galvanic action set up. Bolts can be made from the bar stock which will be stronger than cold rolled steel bolts. A few other parts which can be made to good advantage from this material are landing gear fittings, tail skid swivels, control surface hinges, ball and socket joints and shock absorber units.

Magnalium, an alloy of aluminum and magnesium, has been used considerably in the construction of the framework for Zeppelins, but is now superseded by duralumin. Magnalium was one of the first alloys to be used for pistons.

Electron metal is a German alloy of about 90 per cent magnesium and 10 per cent aluminum. It has the advantage of being only two-thirds as heavy as duralumin, but is only about two-thirds as strong. It can be cast and in that state is very pliable, it being possible to double over the casting 180 deg. without cracking.



An All-Steel Welded Tube Fuselage, the Total Structure Having No Pin Joints or Bolted Fittings, Each Tube Being Welded to Its Adjoining Members, a Very Rigid Framework Being the Result

Disadvantages of All-Metal Planes

There are certain disadvantages of all-metal construction. Any metal structure which is subjected to repeated alternate stresses will, in time, fail. The main structural members of an airplane work under just this condition. The present gas engine, with its various reciprocating parts and the numerous vibrating wires, impose upon the airplane a continuous vibrating motion which as time goes on will cause the wires and fittings to crystallize, and these may then break at any moment.

In an airplane whose principal structural members are wood there is considerable give, which helps to reduce the vibration in the individual fittings. This is not true to the same extent in the all-metal structure, since it is more rigid. The wooden airplane will usually give some warning before failure, such as the loosening of wires or the pulling of fittings into the wooden members. On the other hand, the all-metal machine will usually give no warning whatever of any incipient failure. The crystallized part may break instantly and completely.

Unless the design of an all-metal airplane is calculated with extremely great care it is liable to be much heavier than a similar wooden machine. Further, the designer is considerably more limited by the practical working limits of the material rather than by the actual stresses in the members, particularly out near the tail and in the wings.

Judge Gary Reviews Present Conditions

Addresses Annual Meeting of Steel Corporation on Abolishing the Twelve-Hour Day, the Attitude of Congress and Outlook for Business

CHAIRMAN ELBERT H. GARY of the United States Steel Corporation reviewed the political and business phases of the present situation in this country at the annual stockholders' meeting held at Hoboken, N. J., on April 21, touching also upon the corporation's dividend policy and common stock valuation. Stockholders again expressed confidence in the management by reinstating all retiring directors.

Concerning the change to the shorter workday which became effective last August, Judge Gary declared that the additional cost to the corporation, ascribable to the change, was about $35,000,000 annually, and that it would add approximately 10 per cent to the cost of making steel.

"The corporation carried out the wishes of the late President Harding just before his death," he said, "and the company also met public sentiment, however it may have been created."

Turning to the political situation, Judge Gary said: "The worst thing we have is our American Congress." But opposed to the frame of mind now ruling the legislative group is "a man in the White House, as strong and solid and everlasting as the rock of Gibraltar."

"The worst thing we have," he continued, "about which I hesitate to say anything, and in saying intend to offend no single individual, is our American Congress.

"I speak as a single citizen, and not as a partisan. I speak of men not because of their political affiliations but because of what they have done and are doing. I don't name anyone, because I have a profound dislike to dealing in personalities, and, anyway, I might not be able to name the right person. I take the Congress as a whole and apply the proper principles.

"There are men in Congress who are naturally selfish and who act, vote and take the view which best advances their personal interests. There are others who have good minds and good intentions but whose actions make them just as bad as the first. Others have little experience in business or are of poor judgment or are influenced by unworthy considerations. They, too, bring harm on the country and seem to move against its best interests.

"In a university address some years ago I chose the topic, 'Investigate the Investigators.' I thought it appropriate then, and I so consider it now. No decent man objects to investigation when honestly conducted nor to the exposition of the truth if the circumstances justify it. There are many investigations now being conducted which are unjustified and are carried to an unreasonable extent, and which are calculated to bring undeserved injustice on good men. These I denounce.

Praises the President

"I am not in politics. I have seen President Coolidge but twice, but I take him at his word and I have reason to believe he has in mind the advancement of the best interests of the country and of the progress and prosperity of all its people. That is a great asset.

"I do not speak of him as a Republican, as a President or as one likely to become a candidate. I speak of him as a man."

The President, Judge Gary believes, favors neither capital nor labor and holds no prejudices for or against either.

Increased Capacity

Commenting on general conditions, he said that the company's production capacity had been increased by 112 per cent since its organization and that the volume of business is increasing constantly.

"With respect to the steel business, which I know best," said Judge Gary, "I can say with certainty that at the present time we are making a living. We have a good deal of business on our books. There has been some decline during the last month or so. We have been running at such a high rate, our progress was so rapid and business was expanding at such a rate, that it seemed only natural that we should see a substantial recession, if only a temporary one. In fact, I was surprised on my return from South America to find business as good as it was."

After calling to mind that this is a presidential year, he added that "we need not be surprised if there should be some further recession in business."

Value of the Stock

In reply to stockholders' questions, Judge Gary said that neither the company nor its officials would do anything intentionally to affect the stock market.

"We conduct business with the hope that the securities of the company may be regarded as an investment rather than a speculation; that is, to make them of increasing value. From the beginning of the corporation the value of its securities has increased, sometimes slowly, but always growing."

He pointed out that there was a great deal more to the intrinsic value of the stock than is represented by the difference in the market price when the stock was selling around $8.50 a share and its present level. He added that if the stock was cheap at $8.50 a share years ago it is still cheaper today.

Regarding future dividend payments, Judge Gary merely stated that the action of the directors would depend upon the future course of business.

Could Sell More

"No one can accurately and with certainty prognosticate what will happen in the future. Some people think the extra dividend could be increased quarter after quarter. I make no statement as to that, except to say that the policy of the management is to be careful, prudent, and to look far ahead, as well as to protect your stock, no matter what happens. We cannot control the volume of business. We could sell much more if we would make our prices low enough, but this would not be good business because others would also lower their prices and they would risk our profits for the future."

On the matter of current dividend payments on the common stock, which equal 7 per cent annually, including the last extra payment of 50 cents a share, Judge Gary said: "If we could maintain that regularly and permanently you could see that would make the dividend on the common stock 7 per cent per annum, which is very good for common stock."

For cutting seamless brass tubing to uniform specific lengths, the American Brass Co., which used to charge 1 cent for lengths between 12 in. and 24 in., now makes no extra charge for lengths of 1 ft. and upward to 20 ft. The revision was made March 31.

A competitive examination for physicists to fill vacancies in the Bureau of Standards, Washington, has been announced by the United States Civil Service Commission, Washington, to which application should be made before July 1.

Sales Research an Aid to Production Department

The importance of sales research as a means of reducing the uncertainties confronting production departments was effectively demonstrated in an address by R. B. Flershem, general sales manager, American Radiator Co., at the sales executives convention of the American Management Association, held at Hotel La-Salle, Chicago, April 10.

Nineteen twenty-three, he said, was the first year in which the American Radiator Co. did not fall behind in its deliveries in October. This achievement was directly due to research which not only disclosed the fact that the peak of demand came in the fall months of the year, but also that the average variation in costs was in the proportion of 87 in February, March and April to 100 in September, October and November. Accordingly, a scale of prices was devised according to deliveries, so as to offer an inducement to the buyers to take shipment during the months of slack demand. In other words, if a buyer took deliveries in February, March or April, he would obtain a lower price than if he waited until later. This scale, of course, is unchanged in its ratios at all times, but in terms of dollars and cents, is subject to alteration as a whole whenever base prices are changed.

After a year, it was found that the new plan had materially flattened out the seasonal variation in sales, thereby saving a great deal in invested capital and materially reducing manufacturing costs. In fact, the economies were such as to permit the company to reduce its general level of prices. Under the plan, stocks were practically cut in two and proportionately less working capital was necessary to run the business.

Mr. Flershem also outlined methods used by his company to arrive at forecasts of sales. Every decision of the American Radiator Co. organization, he asserted, is based on forecasts rather than on history. In any growing business, he pointed out, it is necessary to forecast several years ahead so that productive capacity can keep pace with demand. Plant additions cannot be built over night and unless increases in consumption are anticipated, productive capacity will fall behind. In forecasting sales of regular products, past experience is an index of what may be expected in the future. Here the relation of price to demand comes in for particular study because, with other things equal, price reductions will bring equivalent increments in demand. The amount of building activity is also an important consideration. A chart shown by Mr. Flershem indicated a striking correlation between the volume of building and radiator sales. In general, the sale of radiators lags six months behind building demand. Forecasting sales of new products is somewhat more difficult in view of the fact that the increase in demand is very sharp in the first two or three years before a stable trend is reached.

The aim of the company's research department, of course, is to bring about the closest coordination between the sales and production forces. Every year both a sales quota and a production quota are worked out in advance and as the year progresses, these are compared with actual sales and actual production. Likewise estimated stocks on hand are compared with actual stocks on hand. Graphs shown by Mr. Flershem indicated a surprisingly small variation between the calculated and actual results.

Engineering Council Committee Chairmen

Committee appointments for activities of the American Engineering Council have been made by James Hartness, president Jones & Lamson Machine Co., Springfield, Vt., and president of the council.

J. C. Ralston, Spokane, Wash., was named chairman of the council's committee on reforestation and timber supply, and Gardner S. Williams, Ann Arbor, Mich., heads the committee on government reorganization as related to engineering matters. Calvert Townley, New York, vice-president of the Westinghouse Electric & Mfg. Co., is named chairman of the public affairs committee. Dean Arthur M. Greene, Jr., Princeton University, heads the committee on war department personnel, and F. K. Copeland, Chicago, is chairman of the committee on elimination of waste in industry.

The federal power committee is headed by William McClellan and the committee on patents by E. J. Prindle, New York. Max Toltz of St. Paul is chairman of the committee on contracts and adjustments.

Calvert Townley and Fred R. Low, New York, and John H. Finney, Washington, have been appointed delegates to the World Power Conference in London. W. R. Ingalls, New York, mining engineer and economist, is the council's representative on the National Bureau of Economic Research. Rudolph P. Miller, New York, was reappointed to the National Board for Jurisdictional Awards.

Business Conditions Reflected in Coal Consumption

Based on the National Association of Purchasing Agents' survey of coal consumed for industrial purposes, the volume of business as a whole, during March, increased 3½ per cent as compared to the preceding month, but taking into consideration that February had 29 days and March 31 days, and basing the figures on daily averages, the month of March shows a decrease of 3¼ per cent, as compared with February. Indications are that a slowing down of business will be recorded for April, and that the general business curve will show a decided downward curve for that month.

Of the total number of reports received from consumers of industrial coal for March, 27 per cent indicated increases in business, 32 per cent remained stationary, and 41 per cent showed decreases, as compared to the preceding month.

For the first time in many months, the consumption of coal was greater than the production. During March approximately 1,305,000 tons of coal was consumed in excess of the total production. Early reports indicate that there will be a further sharp decline in the output during April, due in part to lack of demand and the curtailment of production on account of sporadic strikes.

Large Capacity High-Frequency Induction Furnaces

A high-frequency induction furnace capable of melting 500 lb. of brass or copper will be built for the U. S. Navy by the Ajax Electrothermic Corporation, Trenton, N. J. Included in the order is also a 200-lb. steel melting induction furnace. The electrical equipment is rated at 140 kva., and according to Dudley Willcox, secretary and sales manager of the company, will mean the putting into the furnaces of more high frequency power than has been employed in any furnace up to this time. At the plant of the Western Electric Co., Chicago, are furnaces melting 100 lb. of steel and rated at 105 kva. The frequency used in all cases is of the order of 15,000 to 20,000 cycles per second.

Wages Increasing

Figures of the National Industrial Conference Board show that hourly earnings increased between February and March from 55.9c. to 56.2c. There was a slight decrease in average hours of work, but not enough to neutralize the increased hourly rate. Average weekly earnings advance from $27.16 to $27.20.

Based on prevailing prices, the worker today has a "real" increase of 40 per cent in hourly earnings and 32 per cent in weekly earnings over July, 1914. His purchasing power with wages received is that much higher than before the war.

These figures are based on records of 1700 manufacturing plants employing 850,000 workers.

The Pennsylvania Steel Export Co. has completed plans and is taking bids on a one-story mill-type extension 70 x 200 ft. to its warehouse at Venango and G Streets, Philadelphia. It will be equipped with a 10-ton crane and used to house the company's concrete-bar department.

Ferrous Alloys Resistant to Corrosion

Stainless Iron for Engineering Uses—Effect of Adding Other Metals, Particularly Copper—The Direct Process—Future of Stainless Metallurgy

BY DR. B. D. SAKLATWALLA

THE problem of corrosion in ferrous metallurgy is of extremely great economic importance on account of the immensely large use of ferrous metals. Several estimates have been attempted as to the monetary loss and staggering figures, as high as approximately $3,000,000,000 per year, have been suggested as covering the total loss, to include not only the corroded metal but also the other expenditures such as protective coatings, replacement labor, etc. When we consider that for every pound of metal lost through corrosion a loss of about four pounds of coal is represented, we can also readily see the importance of the problem from the standpoint of conservation of our natural resources.

Copper-Bearing Steels and Ingot Iron

The first modern industrial attempts, on a large commercial scale, to produce steels resistant to atmospheric conditions were the manufacture of the copper-bearing steels and the pure irons, the so-called open-hearth ingot irons. There has been endless controversy as to the merits of these products and especially as to the influence of copper, much being dependent on the conditions of the atmospheres in which such steels were exposed. From a survey of several exposure tests, Sir Robert Hadfield comes to the general conclusion that the superiority of copper-bearing commercial steels over ordinary steels of the same variety is approximately 10 per cent in pure air and 25 per cent in industrial atmospheres, the greater superiority in the latter case being due to the acid-resistance imparted to the steel by the copper content. The superiority of ingot iron is probably also in similar magnitudes.

High-Chromium Non-Corrosive Steels

The next commercial advent in the field of non-corrosive ferrous alloys is steels containing a fairly high percentage of chromium, either by itself or in the presence of other elements. The classical work done by Sir Robert Hadfield and published about the year 1892, on the effect of chromium in varying percentages in steel, may be said to be the foundation of high-chromium steel metallurgy. Some of the specimens prepared by Sir Robert for this research were found years afterward to be free from corrosion and rust.

Similarly in 1900 Holtzer brothers had exhibited at the Paris Exposition steels containing chromium from 7 to 36 per cent. In Germany, Strauss and Mauerer had done considerable work on such steels, and Borchers and Monnartz were granted a patent in 1912 for steels containing, besides a molybdenum content, 4 to 14 per cent chromium. Also a patent was granted to Pasel for a composition of 12 to 18 per cent chromium together with a nickel content of about 0.5 to 5 per cent. Also in this connection may be mentioned the composition of Haynes, well-known as "Stellite," although it is not a steel or an alloy which can be technically classed as ferrous.

In spite of the fact being long recognized that certain percentages of chromium incorporated in steels rendered them non-corrosive, it was left to Harry Brearley of Sheffield, England, to develop the fact that the non-corrosive properties were dependent more or less on the hardening imparted by heat treatment and this discovery suggested to him the application of this material to cutlery. The first knives manufactured and hardened were found not only to be rust resisting but also not to discolor in contact with vinegar and fruit juices. This suggested to the cutler, Mr. Stuart of R. F. Mosley & Co., who made these knives, the idea of calling them "stainless." This adjective has been carried along, but its true significance has not been realized. Under "stainless" is understood the property of not discoloring within a specified number of minutes, when a drop of a certain strength vinegar or an acidulated solution of copper sulphate or a similar solution is placed on the steel. The popular mind has, however, extended "stainless" to resistance to acids or to atmospheric conditions, which is rather unfortunate.

Effects of Chromium in Steel

For a proper understanding of the properties and application of the non-corrosive chromium steels, it is necessary to survey, from a metallurgical standpoint, the influence exerted by the addition of chromium to steel. The main effects of chromium may be summarized as follows:

1. It lowers the carbon content of the eutectoid proportional to the chromium content so that with about 12 per cent Cr. the carbon content of the eutectoid is lowered to a third.
2. It raises the temperature at which the transformation points occur in steel.
3. It slows up the rate of carbide diffusion in the steel.

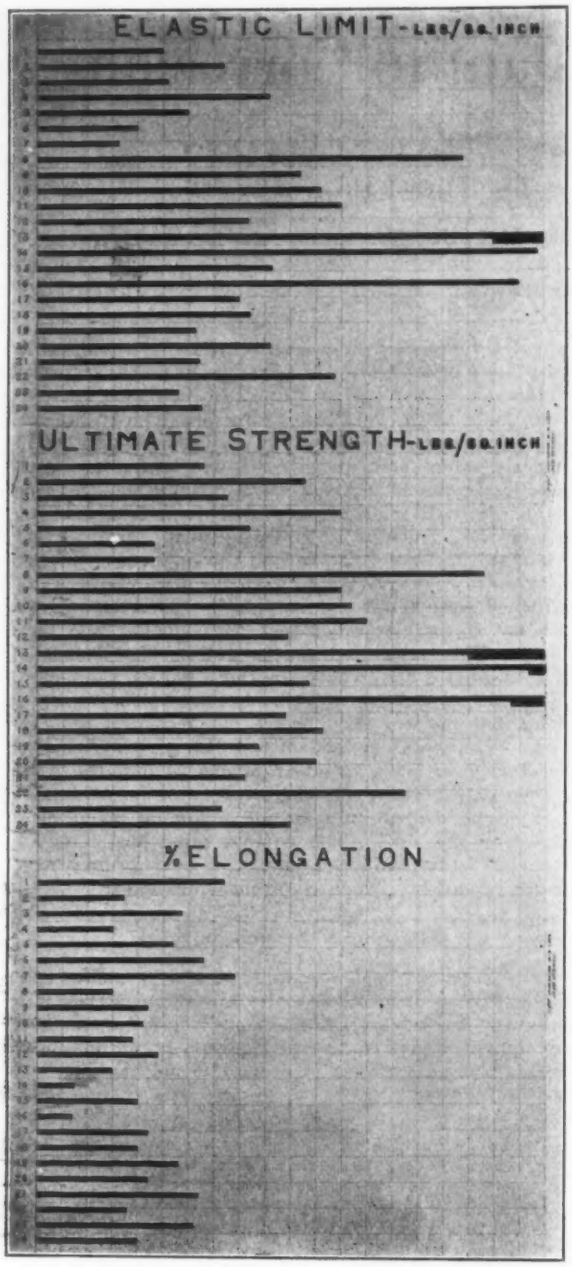
Owing to the first effect we can understand that a small amount of carbon exerts great influence in chromium steels. Carbon in the presence of about 12 to 14 per cent chromium has about three times the hardening effect of similar amount of carbon in a plain steel.

Owing to the second effect, the quenching and tempering temperatures have to be higher than in the case of ordinary steel.

The third effect explains the air-hardening properties of these steels and also their capability of retaining strength at high temperatures.

Also, owing to these effects, we can readily see that by variation of the carbon content with different quenching and tempering temperatures, a very great variety of physical properties can be obtained with the

PRODUCTION of stainless iron on a commercial scale is one of the most important problems now under discussion by American and British metallurgists. Dr. Saklatwalla, general superintendent Vanadium Corporation of America, Bridgeville, Pa., speaks with authority on the subject. He delivered this paper at the Chemists Club, New York, Friday evening, April 18, before the American section of the Society of Chemical Industry. It contains the latest information on this subject.



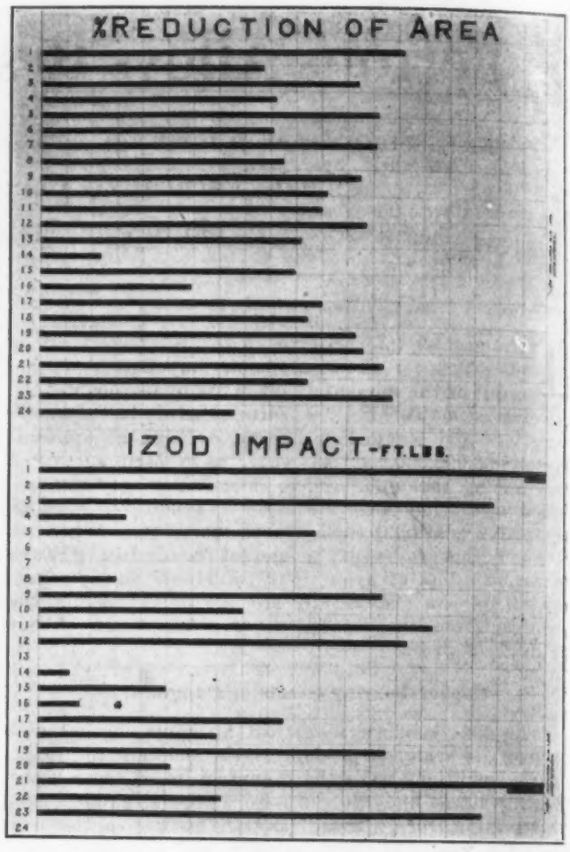


FIG. 1—LEGEND:
1—Plain 0.14 C Steel, Low Draw
2—Plain 0.31 C Steel, Low Draw
3—Plain 0.31 C Steel, High Draw
4—Plain 0.45 C Steel, Low Draw
5—Plain 0.45 C Steel, High Draw
6—Wrought Iron—Double Refined As Rolled
7—Copper Bearing Mild Steel
8—Cr-Ni, Steel, 75-100 Ton Class, Low Draw
9—Cr-Ni, Steel, 75-100 Ton Class, High Draw
10—Cr-Ni, Steel, 50-60 Ton Class, High Draw
11—Cr-Va, Steel, 50-60 Ton Class, High Draw
12—Nickel Steel, 50-60 Ton Class, High Draw
13—Cr-Ni-Mo Steel, 50-60 Ton Class, High Draw
14—Stainless Steel—0.40 C—Low Draw
15—Stainless Steel—0.40 C—High Draw
16—Stainless Steel—0.28 C—Low Draw
17—Stainless Steel—0.28 C—High Draw
18—Stainless Steel—0.15 C—Low Draw
19—Stainless Steel—0.15 C—High Draw
20—Stainless Iron—0.10 C—Low Draw
21—Stainless Iron—0.10 C—High Draw
22—Stainless Iron—0.07 C—Low Draw
23—Stainless Iron—0.07 C—High Draw
24—High Chrome Iron Alloy

same chromium content. This fact fortunately makes the high-chromium steels applicable to most all purposes where steel can be used. The commercial grades with varying carbon and varying heat treatment offer a range of from 60,000 to 200,000 lb. per sq. in. tensile strength. Similarly the ductility and Brinell hardness can be obtained to suit almost any engineering purpose.

Chromium and Other Engineering Steels

To form an idea as to the comparative value of these chromium steels with other engineering steels, the physical properties are diagrammatically put together in Fig. 1, showing that in their physical properties these steels are the equal of the highest grade of alloy steel on the market today. Thus, they afford a material not only resistant to corrosive influences but also to mechanical stresses at the same time.

Combined with the different physical properties brought about with different heat treatments are also the variations in corrosion and stain resisting properties. It is found that the steels in the hardened conditions are more resistant to corrosion than the same steels in the annealed condition. This is generally ascribed to refinement of structure and greater homogenity in the hardened state. However, it has also been suggested that the chromium content dissolved in the ferrite in the annealed condition may be less than in the hardened condition, causing less resistivity to corroding influences. Moreover these steels, in common with all other ferrous metals, are more resistant to corrosion when they are smooth and free from surface distortions and in the polished condition.

From the above it can be easily seen that the practical industrial development of non-corrosive ferrous alloys demands in the finished material not only careful chemical composition but also great care in heat treating and fabricating, avoiding surface distortion and surface imperfections to a great extent.

Chemical Composition and Its Relation to Corrosion

The most generally known non-corrosive high chromium steel is the so-called "stainless" steel used for cutlery purposes. This steel contains usually between 12 and 14 per cent chromium and between 0.25 and 0.35 per cent carbon. This composition is particularly adapted for cutlery purposes and it is with this use in mind that the limits of chromium and carbon were chosen. It was believed that above 14 per cent the excess chromium tended to soften the cutlery blade in spite of increasing the carbon. Also under 14 per cent chromium excess of carbon over 0.35 per cent tends to make the blade less stain-proof.

This composition, however, has little bearing on non-corrosive steels for general engineering purposes. With

the development of rustless metallurgy, it was found that by decreasing the carbon to under 0.15 or 0.12 per cent, with the same chromium content, a metal is obtained which is much more resistant to corrosive influences, is more ductile for general fabricating purposes, and also shows in the low-carbon ranges, say under 0.10 per cent, non-corrosive properties, not only in the hardened but also in the annealed condition. Such steels are put on the market under the name of "stainless" or "rustless" iron. For resistance to oxidation at atmospheric and also at higher temperatures, an increased chromium content seems to be beneficial. Steels with chromium content up to 20 per cent, or slightly higher, show remarkable properties of non-scaling at high tem-

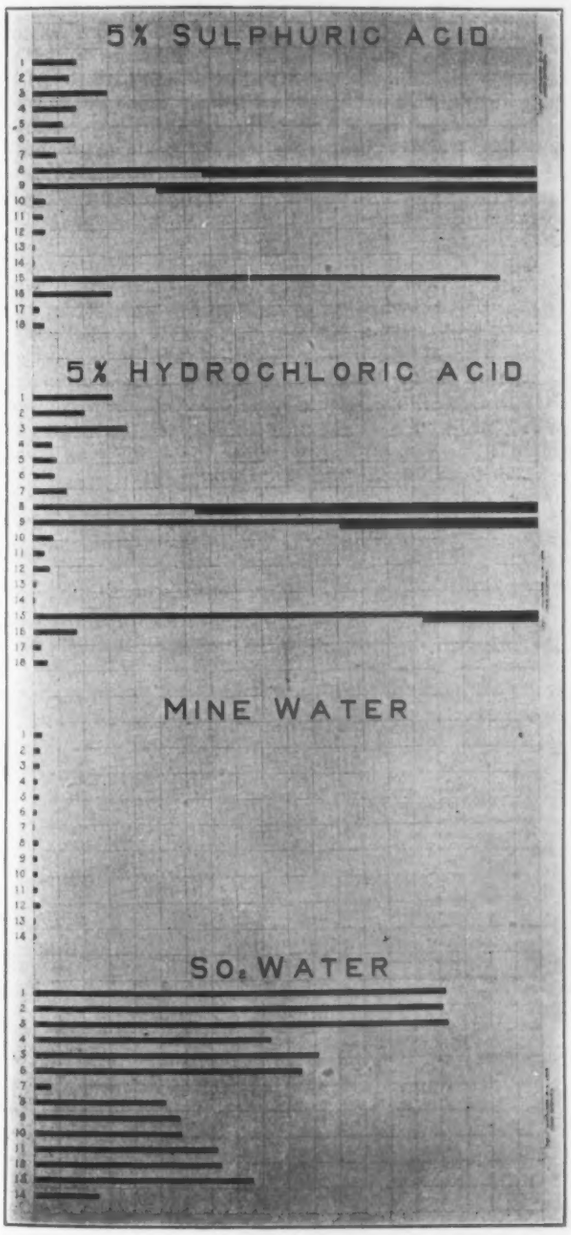


FIG. 3—LEGEND:

1—Mild Steel, As Rolled
2—Mild Steel, Annealed
3—Mild Steel, Quenched
4—Rustless Chrome Iron, As Forged
5—Rustless Chrome Iron, Annealed
6—Rustless Chrome Iron, Quenched
7—Rustless High Chrome-Copper, As Forged
8—Stainless, Annealed
9—Stainless, Low Draw
10—Rustless Low Chrome-Copper, Low Draw
11—Rustless Low Chrome-Copper, High Draw
12—Rustless Low Chrome-Copper, Annealed
13—Rezistal, Annealed
14—Monel Metal, As Rolled
15—Wrought Iron, Double Refined
16—Staybolt Iron, Electric Refined
17—Copper-Bearing Steel, Brand No. 1
18—Copper-Bearing Steel, Brand No. 2

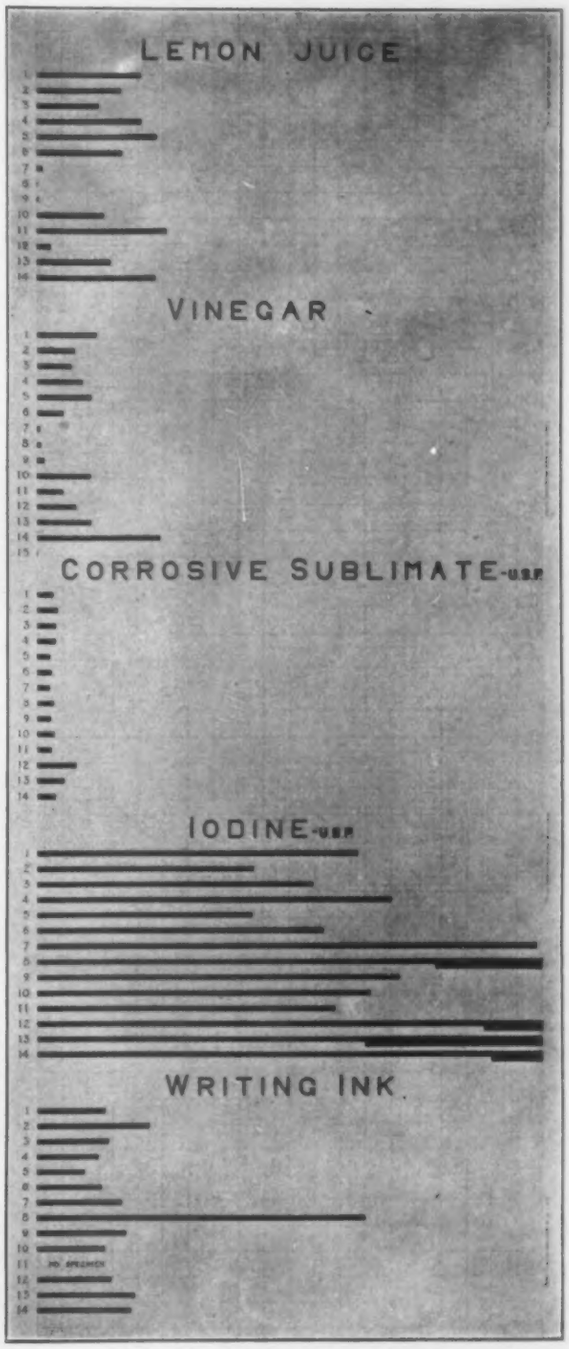


FIG. 2—LEGEND:

1—Mild Steel, As Rolled
2—Mild Steel, Low Draw
3—Mild Steel, High Draw
4—Mild Steel, Annealed
5—Stainless Steel, Low Draw
6—Stainless Steel, Annealed
7—Rustless High Chrome-Copper Low Draw
8—Rustless High Chrome-Copper High Draw
9—Rustless High Chrome-Copper Annealed
10—Rustless Low Chrome-Copper, Cast Annealed
11—Rustless Low Chrome-Copper, As Forged
12—Rustless Low Chrome-Copper, Low Draw
13—Rustless Low Chrome-Copper, High Draw
14—Rustless Low Chrome-Copper, Annealed
15—Rustless Chrome Iron, Annealed

Time of test 42 days. All pieces finished on Barton No. 1, fine emery cloth. Unit of corrosion = Loss in grams per Sq. Cm.

peratures and of resisting fresh and salt water corrosion.

Acids Affect "Stainless Steels"

From the standpoint of the chemical engineer, however, the plain high-chromium carbon steels with any percentages of chromium and carbon, hardened or annealed, are liable to prove a source of some disappoint-

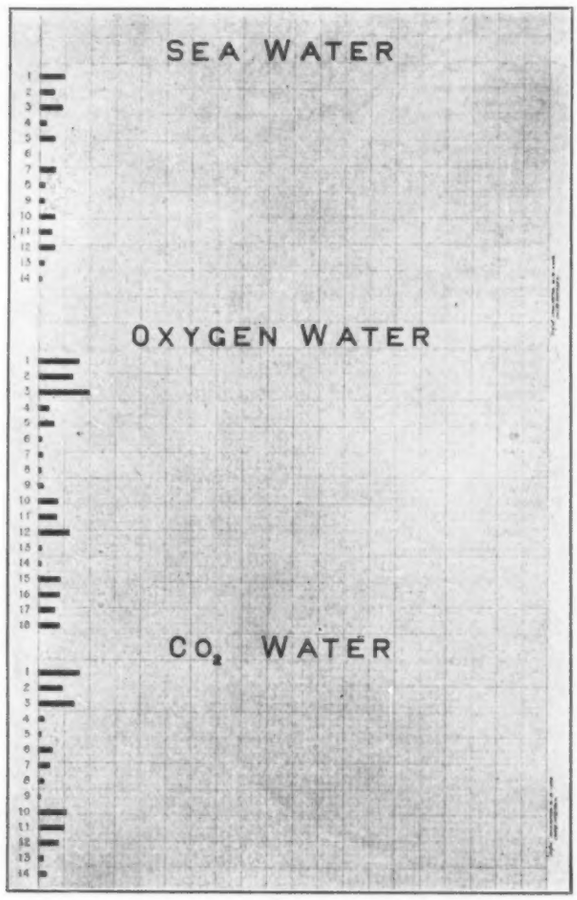


FIG. 4—LEGEND:
1—Mild Steel, As Rolled
2—Mild Steel, Annealed
3—Mild Steel, Hardened
4—Rustless Chrome-Iron, As Rolled
5—Rustless Chrome-Iron, Annealed
6—Rustless Chrome-Iron, Hardened
7—Rustless High Chrome-Copper, As Forged
8—Stainless Steel, Annealed
9—Stainless Steel, Low Draw
10—Rustless Low Chrome-Copper, Low Draw
11—Rustless Low Chrome-Copper, High Draw
12—Rustless Low Chrome-Copper, Annealed
13—Rezistal, Annealed
14—Monel Metal, As Rolled
15—Wrought Iron, Double Refined
16—Staybolt Iron, Electric Refined
17—Copper-Bearing Steel, Brand No. 1
18—Copper-Bearing Steel, Brand No. 2

Unit of corrosion—Loss in grams per Sq. Cm.
Duration of test, 24 hr.

ment. In spite of their ability to withstand oxidation and staining from food products, and in spite of the prevalent popular belief, they are not resistant to action of acids. While in contact with fruit acids for a short period they do not discolor, yet submerged for long periods in fruit and other organic acids, they lose considerable weight through solution, and in mineral acids, with the exception of nitric, show very quick dissolution. In fact, such steels are more soluble in hydrochloric and sulphuric acids than plain carbon steels.

In order to impart acid resistance to these stee's, combined with their property to withstand oxidation, several other elements have been added to them. Nickel steels with about 25 per cent nickel content have excellent resistance to mineral acids but are expensive and are not malleable for the purposes of general fabrication. The addition of nickel to the high chromium steels imparts acid resistance; but as this resistance does not take place until the nickel content is high, from 5 to 20 per cent, such steels suffer from the same deficiencies as the plain high nickel steels. The original Pasel steels made by Krupp, and Johnson's "Rezistal" made by the Crucible Steel Co. of America, are types of such steels.

Other elements added to impart acid resistance have been molybdenum and tungsten. These elements, while not necessary in excessive percentages, generally not over 2 to 3 per cent, yet on account of their high price make such steels not economically useful. The earlier steels of Borchers and Monnartz were of this class.

Marked Effect of Copper

The element which can be added to high-chromium steels imparting to them, together with the ability of withstanding oxidation, excellent acid-resisting properties without the drawbacks of any of the above described elements, is copper. The amount of copper necessary for this purpose is small, depending on the percentage of chromium, generally not exceeding 1.5 and in many cases not even 0.5 per cent. Such copper-chromium steels, especially in the low-carbon ranges of under 0.15 per cent C., present very remarkable all round non-corrosive properties. The acid resistance is obtained not only without sacrificing any of the oxidation resisting properties, but the copper percentange actually helps the chromium to withstand oxidation better. Also the copper-chromium steels are not so much dependent on the state of hardening to bring about non-rusting and non-corrosive properties as the plain high-chromium steels. On account of the small amount necessary and on account of the low price of copper, such steels seem to have a very promising broad industrial future.

Other elements which may be considered in connection with a high chromium content are manganese and silicon. Their presence is not for the purpose of increasing corrosion-resistivity of one kind or the other, but to impart to the steels certain favorable physical properties during fabrication. The presence of about 1.5 per cent silicon is claimed to be beneficial in the rolling properties of high-chromium steels. As an example of such steels may be cited the Armstrong composition manufactured by the Ludlum Steel Co. High-silicon cast iron such as "Duriron" and "Tantiron," while possessing good corrosive resisting properties, lack the physical strength and mechanical properties.

Comparative Tests

Figs. 2, 3 and 4 show a comparative tabulation of the corrosion resisting properties of several steels and

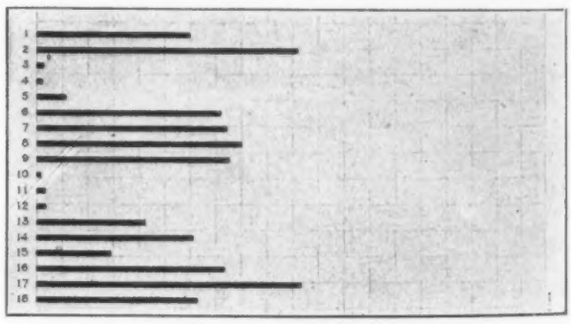


FIG. 5—LEGEND:
1—Mild Steel, As Rolled
2—Ingot Iron, As Rolled
3—High Chrome Iron, As Rolled
4—Stainless Steel, As Rolled
5—Stainless Steel, Low Draw
6—Low Chrome-Copper Iron, As Forged
7—Low Chrome-Copper Iron, Low Draw
8—Low Chrome-Copper Iron, High Draw
9—Low Chrome-Copper Iron, Annealed
10—High Chrome-Copper Iron, Low Draw
11—High Chrome-Copper Iron, High Draw
12—High Chrome-Copper Iron, Annealed
13—Valve Stem, High-Priced Car
14—Valve Head, High-Priced Car
15—Valve Stem, Medium-Priced Car
16—Valve Head, Medium-Priced Car
17—Valve Stem, Low-Priced Car
18—Valve Head, Low-Priced Car

Unit of scaling—Gain in grams per Sq. Cm.
Duration of test—3 hr.

alloys in different conditions of heat treatment, in different corroding media encountered in the industries. The corrosion is measured by submerging pieces of approximately equal size, smoothed on No. 1 emery paper, in equal amounts of the solution, and tabulating the losses in grams per square centimeter of surface exposed in 24 hr.

Fig. 5 shows the comparative values of several steels in resisting scaling at high temperatures. The test pieces were kept at a constant temperature about 800 deg. C. exposed to the combustion gases of a gasoline torch for about three hours. The rate of scaling is measured by the gain in weight in grams per square centimeter of the surface exposed. For comparison with present commercial steels, the exhaust valves of three widely known automobiles were used together with the specimen steels.

Fig. 6 shows a photographic reproduction of test pieces of various materials exposed for six months to the atmosphere in close proximty to a manufacturing plant and chemical laboratory. The first two pieces, top row from the left, are high-chromium copper steels, the first being in the annealed and the second in the hardened condition, the next two are commercial high-chromium low-carbon rustless irons, the fifth piece is stainless cutlery steel hardened and the sixth the same steel in the annealed condition. The rest of the pieces are commercial steels and irons, including wrought irons, double refined electric irons, copper-bearing steels, open-hearth ingot iron, and ordinary mild steel. This comparison on small sized specimens is submitted merely to derive a visual idea of the degree of resistance offered by the high-chromium steels compared to that offered by the materials used for similiar purposes at present.

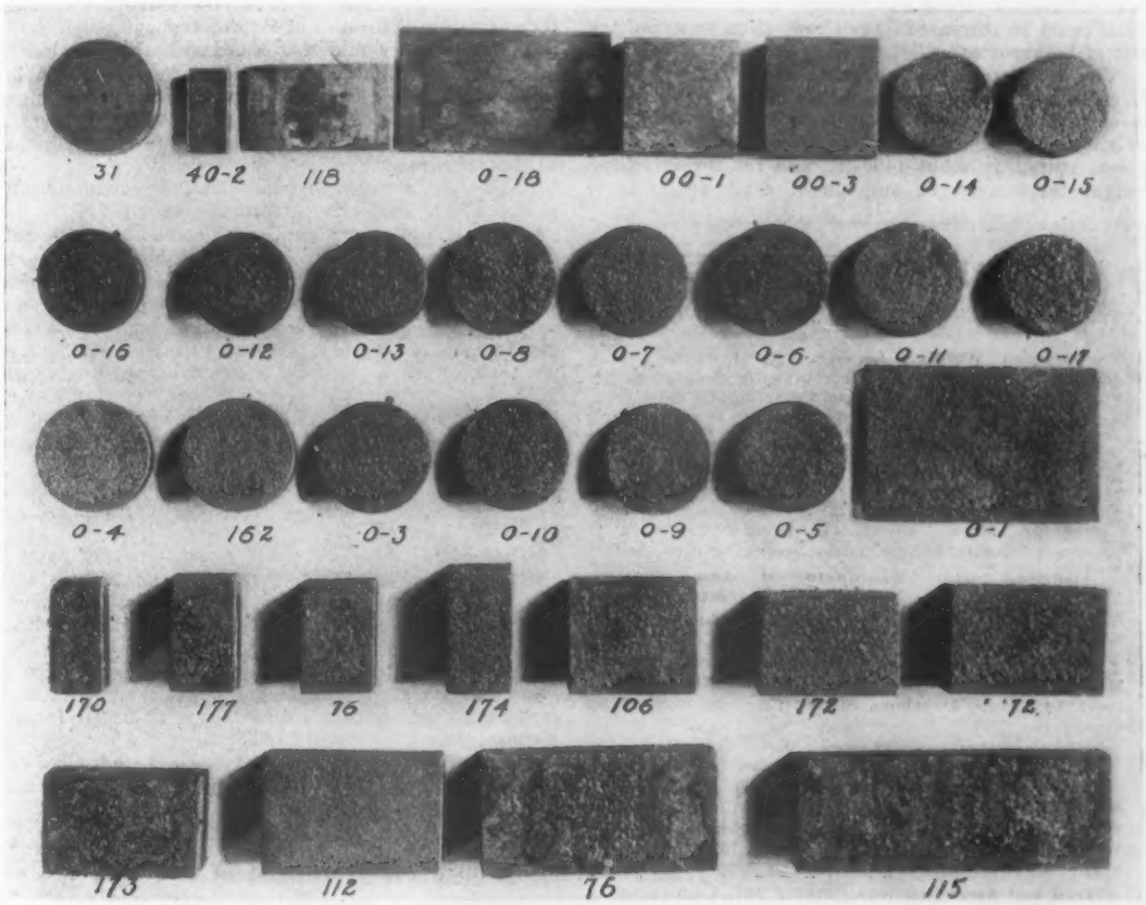


Fig. 6—Reproduction of Test Pieces of Various Materials Exposed for Six Months to the Atmosphere in Close Proximity to a Manufacturing Plant and Chemical Laboratory. See text for details

Future Expansion of Rustless Metallurgy

The future of commercial development and wide engineering application undoubtedly lies with the low-carbon alloys, either containing chromium alone or together with another element such as copper. This is owing to the better corrosion resisting and mechanical properties of such alloys.

The great hindrance, however, to the rapid progress of commercial expansion has been the hitherto high cost of production of such steels. At the prevailing prices of these steels, they can enjoy only a very restricted field. This high cost is due to it being necessary to use a high-grade low-carbon ferrochromium for the introduction of the chromium content. While, since the advent of "rustless" and "stainless" steels, the price of such ferrochromium has been considerably decreased to between 35 and 40 cents per lb. of contained chromium, yet when we consider that about 300 to 400 lb. of chromium are added per ton of steel, the cost per ton runs up into figures, which would make the steel thus produced incapable of ever competing with ordinary steel products, such as galvanized sheets, tin plate, etc.

Within the last few years, however, considerable metallurgical work has been done, whereby it is now commercially possible to produce on a large scale high-chromium steels without the use of the expensive ferro-chromium. Chromium can be introduced into a bath of refined steel directly from chrome ore, reducing the chromium content of such ore by means of silicon introduced in the steel. As chrome ore and ferrosilicon are both comparatively cheap and easily obtainable commodities, such direct process puts an entirely different commercial phase on the rustless industry. Chrome ore of a grade running about 50 per cent Cr_2O_3 is worth approximately $20 per gross ton, so that the unit of chrome content can be obtained in steel at only a small fraction of the 35 to 40 cents which is the case when ferrochromium is used. Consequently such a process enables the production of high-chromium steels at comparatively low costs, thus insuring their wide and extended use which they justly deserve.

The squares in each chart represent 1 in., with the scale in Fig. 1 at 1 in. = 10,000 lb. per sq. in.; in Figs. 2 and 3 at 1 in. = 0.01 gram per sq. cm.; in Figs. 4 and 5 at 1 in. = 0.001 gram per sq. cm.

PROPOSES STEEL SUBSTITUTE

Vice-President Atterbury Suggests Possibility of Increased Use of Aluminum

WASHINGTON, April 22.—Testifying before the Senate Committee on Agriculture last Saturday in support of the bid made by himself and Elon M. Hooker for Muscle Shoals, Vice-President W. W. Atterbury of the Pennsylvania Railroad, in touching upon plans being studied to lower the cost of railroad transportation, disclosed the interesting suggestion that thought has been given to the construction of aluminum cars.

Pointing out that during the war German Zeppelins were made from a composition of aluminum and magnesium, Mr. Atterbury said:

"I plan to devote considerable time, if we obtain Muscle Shoals, to research work in an effort to manufacture railroad cars out of this aluminum composition. It is sufficiently strong and because of its lightness, the loads could be increased 50 per cent, thus lessening the cost of transportation."

Use of metal such as contained in the German Zeppelins, Mr. Atterbury said, would bring about a revolution in locomotive and car construction. The weight per passenger for the ordinary passenger car, it was stated, is about 1400 lb., and for three tons of freight there must be one ton of dead weight in a freight car. The average 70-ton coal car, for instance, it was explained, will weigh approximately 25 tons.

"If I can cut down the weight of that car I can carry a 17 per cent increase in the load in the car with no increase in the cost of transportation."

Mr. Atterbury, replying to a question by Chairman Norris, said he was assuming that he can cut down the weight 50 per cent with the weight of material about 30 per cent of ordinary steel. With the passenger car, he said, it ought to be possible, with the use of such a metal, to reduce the weight about half for each car.

"Now, whether it is possible to produce aluminum at a cost to make it possible to use in locomotive and car construction I do not know," declared Mr. Atterbury. "That is a question that has got to be developed and experimented with, but I do know that the efficient production at low cost of aluminum is directly dependent upon cheap electricity."

It was asserted that in that respect Muscle Shoals ought to be of benefit to all of the transportation interests within 200 miles of its development.

Mr. Atterbury said that the metal which he has in mind is approximately 25 per cent to 35 per cent of the weight of steel and that it would be possible to get up to approximately 45,000 to 50,000 lb. tensile strength, which, it was stated, is a little less than that of the soft steels.

Asked by Senator Smith if it is approximately as strong as the steel, Mr. Atterbury replied:

"Oh, no, not your high-carbon steels, but your soft steels. It is sufficiently strong to enable it to be used as a substitute for steel in a very large part of either car or locomotive construction. For boiler work, no; but for many of the fittings and trimmings of the locomotive, and for the sides of cars and for a large part of the frame work of the car it would be possible to use it."

"Have you investigated to know what per cent of the steel could be substituted by this and maintain safety?" asked Senator Smith.

"Oh, yes; I should say roughly 50 per cent in freight and passenger cars and perhaps 30 per cent in a locomotive."

Pressed for details regarding the source of bauxite and of the ability of aluminum alloy to compete with steel, Mr. Atterbury said he did not know how cheap it can be made or whether it can compete with steel, but that this is a question for research.

"I do know," he said, "that with the present price of aluminum it is not possible to make this metal at a cost that would permit the railroads to use it for the purpose that I have indicated."

He said that it would be necessary to reduce the cost of aluminum "very materially" in order to use it commercially in these ways.

COMING MEETINGS

April

American Welding Society. April 23 to 26. Annual meeting, 29 West Thirty-ninth Street, New York. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Electrochemical Society. April 24 to 26. Spring meeting at Philadelphia. Dr. Colin G. Fink, Columbia University, New York, secretary.

Taylor Society. April 24, 25 and 26. Meeting at Cambridge, Mass. Dr. H. S. Person, 29 West Thirty-ninth Street, New York, managing director.

American Gear Manufacturers' Association. April 28 to 30. Spring meeting, Lafayette Hotel, Buffalo. T. W. Owen, 2443 Prospect Avenue, Cleveland, secretary.

Society of Industrial Engineers. April 30 to May 2. Annual convention at Buffalo. George C. Dent, 608 South Dearborn Street, Chicago, general manager.

May

National Association of Sheet and Tin Plate Manufacturers. May 5 to 10. Second annual convention, Hotel Greenbrier, White Sulphur Springs, W. Va. W. W. Lower, 1832 Oliver Building, Pittsburgh, secretary.

Iron and Steel Institute. May 8 and 9. Annual meeting at the Institution of Civil Engineers, London. G. C. Lloyd, 28 Victoria Street, London, secretary.

Southern Supply and Machinery Dealers' Association, National Supply and Machinery Dealers' Association and American Supply and Machinery Manufacturers' Association. May 19 to 21. Triple convention at Hotel Cleveland, Cleveland.

National Association of Purchasing Agents. May 20 to 23. Annual convention, Mechanics Hall, Boston. W. L. Chandler, 19 Park Place, New York, secretary.

American Society for Steel Treating. May 22 and 23. Spring sectional meeting, Hotel LeClaire, Moline, Ill. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

National Pipe and Supply Association. May 22 and 23. Annual meeting Hotel Cleveland, Cleveland. George L. McIlvane, 909 Oliver Building, Pittsburgh, secretary.

American Society of Mechanical Engineers. May 26 to 29. Spring meeting, Hotel Cleveland, Cleveland. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

Basic Pig Iron Sold at $21, Valley

YOUNGSTOWN, April 22.—An Upper-Valley steel interest has purchased 500 tons of basic pig iron from another Valley steel-works company at $21 per ton, or $1 below the prevailing market. A merchant iron producer offered to supply the iron at the same price, stating it would lose $1 per ton, but preferred to help clear its yards, as it is about to suspend production.

Iron makers say there is little demand for foundry grades at present. The most hopeful aspect of the situation, they point out, is in the fact that stocks in hands of consumers are very low, and even a modest revival in buying will bring about an increased demand.

Cost of Living Lower

Cost of living is reported by the National Industrial Conference Board as slightly lower in March than in February, the figure for March being 63.2 per cent above July, 1914, and 20.2 per cent below the peak in July, 1920. Changes since November include a food drop of 4.6 per cent and a fuel drop of 3.1 per cent. These were partially offset by an increase of nearly 3 per cent in rent, leaving a net decrease of 1.3 per cent in the total.

Problems in Repairing the Leviathan

How the Boston Navy Yard Accomplished Machining Operations of Unusual Magnitude by Special Rigging of Existing Machines

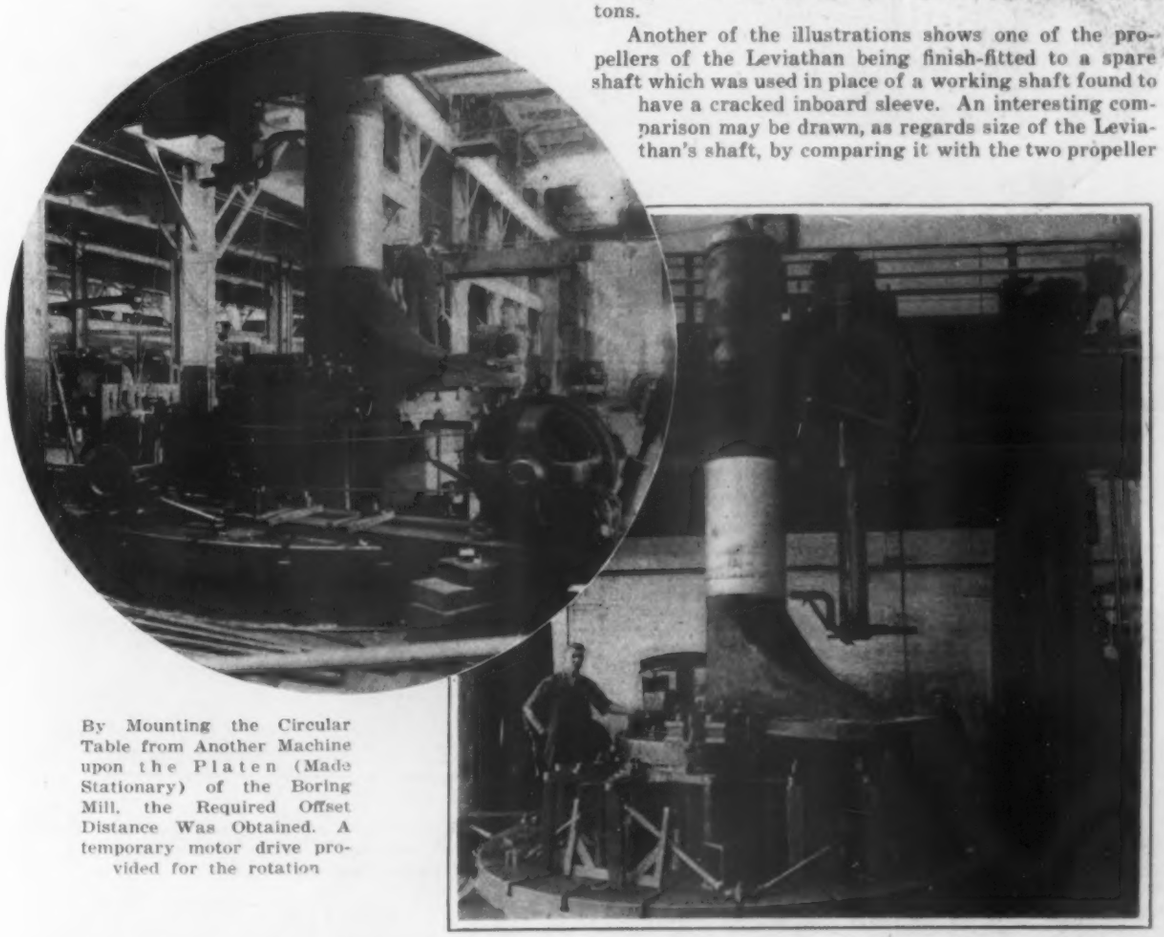
THE steamship Leviathan has twice undergone repairs at the Boston Navy Yard, the most extensive being on the occasion of her first visit in the spring of 1923. Photographs are here reproduced giving some idea of the magnitude and the problems of the machining operations carried on at that time. The illustrations only recently were made available by the Navy Department.

Two of the photographs show the lower section of the rudder stock being machined to receive a bronze bearing sleeve. This item of work was a modification of the original design, the steel rudder stock having been originally fitted to turn in a steel bearing. Owing to the large amount of swing required to revolve the palm of this section, the cylindrical portion could not be turned off in the largest available engine lathe at the Navy Yard, which has a maximum swing of 120 in. Also, due to the large diameter of the portion of the stock to be turned, there was not sufficient offset distance between the face of the cross-rail and the center of the platen of the large Niles vertical boring and turning mill available at this yard to permit the work's being done on this machine by ordinary methods.

The work was accomplished, however, as shown by the photographs, by removing the circular table from a Niles horizontal floor mill; by securing this circular table to the vertical boring mill platen in a position offset to the front of the machine a distance of about 14 in. from the center of platen rotation; by disconnecting the vertical mill platen driving mechanism; by securing the mill platen from rotating, by means of improvised side bars held against the mill columns; and by driving the circular table by means of an independent motor temporarily installed on an improvised mounting, as shown by the rear view of the set-up.

This method permitted the full use of the boring mill cross-rail, tool-head and feeding mechanism as in the ordinary method of operation, but with the platen of the machine remaining stationary. This lower section alone, of the rudder stock, weighed approximately 18 tons.

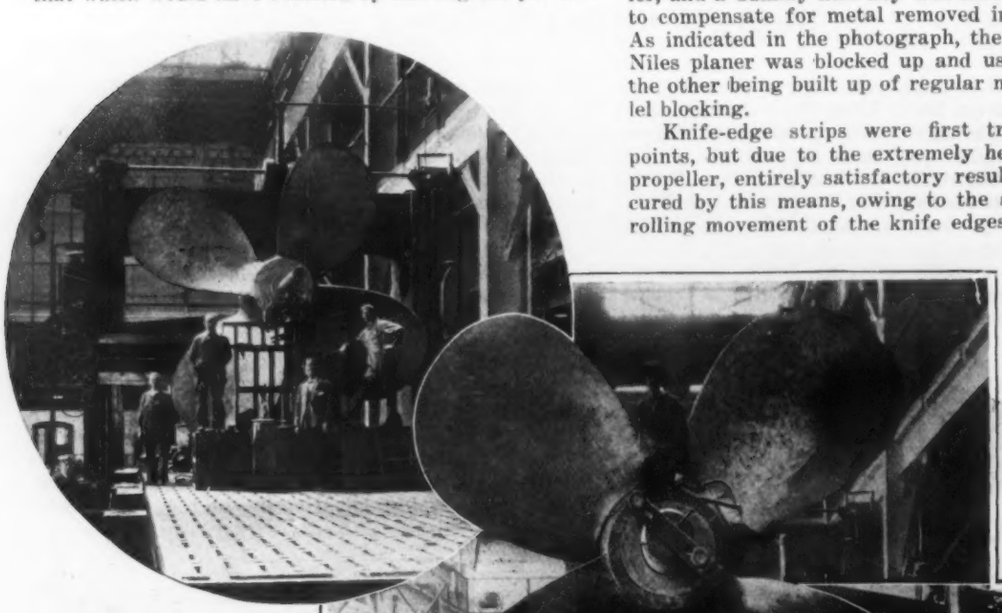
Another of the illustrations shows one of the propellers of the Leviathan being finish-fitted to a spare shaft which was used in place of a working shaft found to have a cracked inboard sleeve. An interesting comparison may be drawn, as regards size of the Leviathan's shaft, by comparing it with the two propeller shafts of the U. S. S. Cleveland, 9 in. in diameter and 20 ft. long, lying on the floor alongside the planer platen.



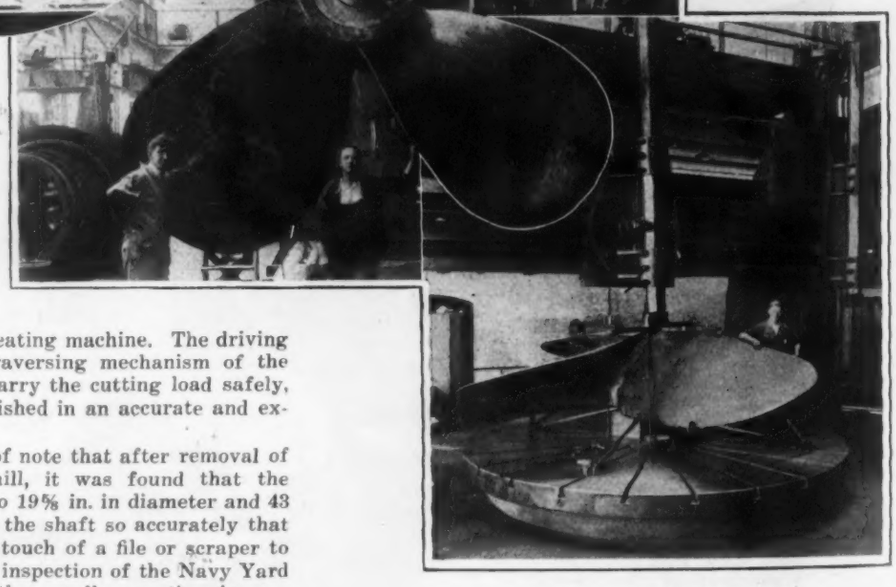
By Mounting the Circular Table from Another Machine upon the Platen (Made Stationary) of the Boring Mill, the Required Offset Distance Was Obtained. A temporary motor drive provided for the rotation

The second group of illustrations shows in the middle picture one of the propellers being finish-fitted to its shaft after scraping the bore of the hub and draw-filing the taper fit of the shaft. As shown by this view, and also the shaft view just referred to, the shaft was mounted in V-block supports resting on the 40-ft. Niles planer platen. This arrangement afforded an exceptionally convenient method of carrying the shaft into the bore of the propeller hub, and withdrawing it from time to time as the fitting proceeded. The regular reversing motor drive of the planer was used for this purpose, permitting an accurate control of the platen movement. The propeller is a single casting of bronze, 16 ft. 7 in. in diameter, 15 ft. pitch, and weighs 18 tons.

At the lower right of the second group is shown a new propeller for the Leviathan being bored on a Niles mill for the taper fit. The unusual feature of this job, aside from its huge size, is that the boring tool bar of the mill was also used to cut the 4 3/16-in. hub spline without changing the setup on the machine, thus securing a large saving of time and cost as compared with that which would have resulted by shifting the job to a slotting machine or a key-seating machine. The driving friction of the tool bar traversing mechanism of the mill was adjusted just to carry the cutting load safely, and the work was accomplished in an accurate and expeditious manner.



The Boring Tool Bar Was Used Also to Cut the Hub Spline (Below) with Changing Set-up on Machine



In Balancing a Special Arbor Was Made Carrying Two Round Edge Disks. The cross rail of a planer was used for one support and parallel blocking for the other

It is especially worthy of note that after removal of the propeller from the mill, it was found that the propeller bore, 16 9/32 in. to 19⅝ in. in diameter and 43 in. long, fitted the taper of the shaft so accurately that it did not require even the touch of a file or scraper to fit it to pass the regulation inspection of the Navy Yard officials, and subsequently the equally exacting inspections prescribed by officials of the American Bureau of Shipping, the United States Shipping Board and the engineering officials of the Leviathan.

Another photograph shows the propeller shaft in a Niles shaft lathe for the purpose of testing straightness and turning off that portion of inboard bearing sleeve where it had become grooved by the stuffing box packing. The grooving referred to may be seen in the photograph as just back of the lathe compound slide rest. The length of the shaft is 47 ft. 7½ in.; the diameter, 19 11/16 in.; the diameter of the bearing sleeves, 21⅝ in., and the weight of the piece about 25 tons.

Attention is invited to the two soft rubber bands or sleeves, 9½ in. wide, used for sealing the joint between the after end of the forward bearing sleeve and the forward end of the middle protecting casing of the shaft; also at the joint between the forward end of the after bearing sleeve and the after end of the middle casing. These protecting rubber bands are vulcanized in place, affording protection for the shafts and at the same time providing a desirable amount of flexibility at the sleeve and casing joints. This method of applying rubber to the sleeve joints of the propeller shafting is used to a considerable extent at the Boston Navy Yard for naval vessels as well as for some of the Shipping Board and United States Line vessels.

The upper left photograph of the group shows the setup for balancing a new propeller. A special balancing arbor was made, carrying two round-edge disks having screw adjustments to fit the bore of the propeller, and a dummy half-key was fitted to the hub spline to compensate for metal removed in splining the hub. As indicated in the photograph, the cross rail of a 40 Niles planer was blocked up and used as one support, the other being built up of regular machine shop parallel blocking.

Knife-edge strips were first tried as supporting points, but due to the extremely heavy weight of the propeller, entirely satisfactory results could not be secured by this means, owing to the sluggishness of the rolling movement of the knife edges. Frictionless ball bearings from an Akimoff dynamic balancing apparatus were then substituted in place of the knife edges, and highly satisfactory results obtained.

Slight Decrease in Iron and Steel Mill Operations in Pennsylvania

HARRISBURG, PA., April 21.—Operations of iron and steel mills in Pennsylvania seem to have slowed down slightly during the first half of April, according to the semi-monthly report on labor conditions to Dr. Royal Meeker, secretary of Labor and Industry in Pennsylvania.

Erie notes that additional men have been laid off, and estimates that mills are operating at 79 per cent of capacity. A surplus of all classes of skilled mechanics exists, with the prospect that additional men will be released during the last half of the month. Scranton also reports that men are being discharged or furloughed. Williamsport finds that the demand for workers has ceased, and that men are being furloughed for short periods. Some first class mechanics are reported to be taking laboring jobs.

Johnstown has an over supply of help, with steel plants and metal industries operating somewhat below the rate for the preceding half-month.

Harrisburg finds that business is sufficient to maintain operating schedules, although it is termed "quiet." The supply of workers is said to be well balanced. Recent high waters of the Susquehanna River and other streams caused a temporary lull in some plants. Reading reports that foundries seem to be busy and adding men, while some tube plants are laying off workers temporarily.

Philadelphia reports no decrease in demand for workers, being the most optimistic of any office in the State to report. The navy yard is reported to have added patternmakers, riggers and painters, while the Westinghouse is said to have hired more tool grinders, tool makers, milling machine men and sheet metal workers. The Sun Shipbuilding plant at Chester has also added men.

Manufacturing Consumers of Steel Busy in the Mahoning Valley

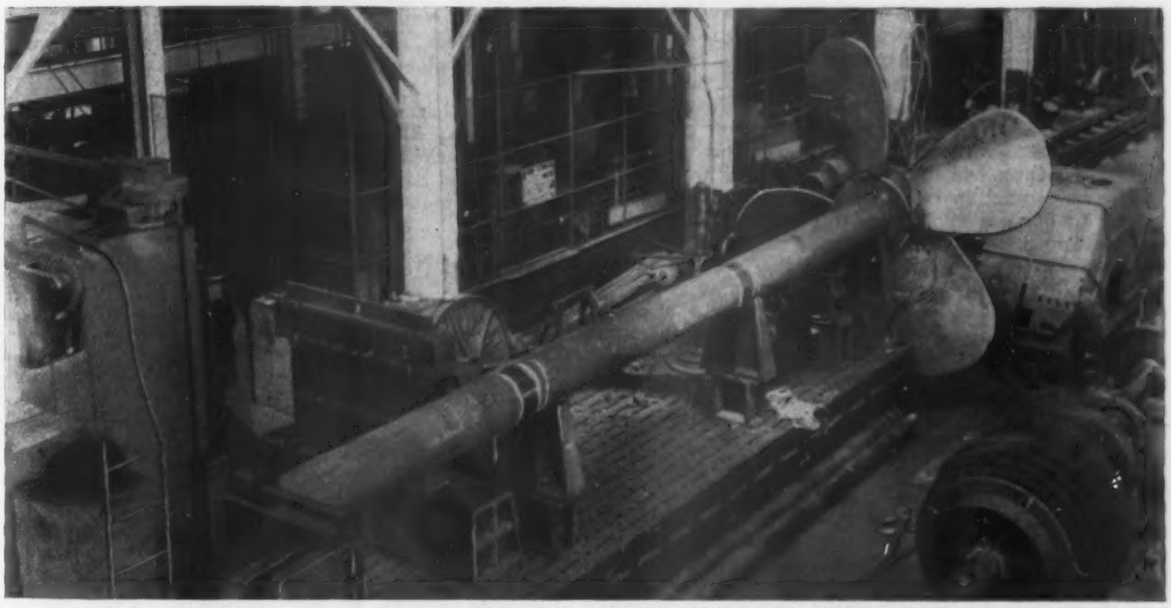
YOUNGSTOWN, April 22.—Though production in the primary steel industry is being reduced in the Mahoning Valley, manufacturing consumers of steel products are feeling the stimulating effects of large-volume building construction in the principal population centers.

Such fabricators as the Truscon Steel Co. and the General Fireproofing Co. are enjoying expanding demand. The Fireproofing company is operating at a capacity rate in its metal furniture department, with enough business already booked and in prospect to insure maintenance of a high production rate for a considerable period. While there is less urgency in the demand for fireproofing materials, the requirements are nevertheless sufficient to maintain production close to normal, and heavy operations for an indefinite period are predicted.

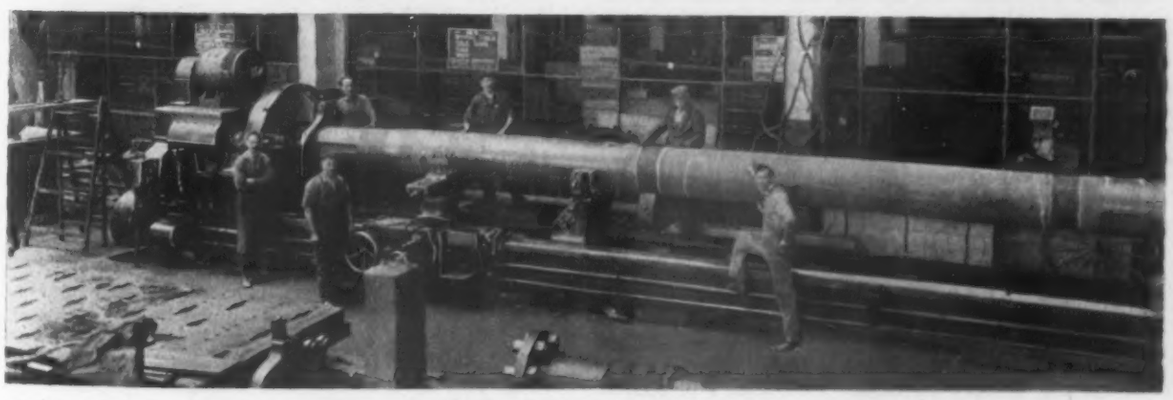
The Truscon company is operating almost full, with big business ahead, states a representative. President Julius Kahn expects 1924 business to fully equal that of the record year of 1923.

The company will have business for extensions which come into active operation next month, increasing its capacity about 15 per cent.

Adjusting One of the Leviathan's Propellers to Its Shaft



In Fitting the Propeller to the Shaft, the Mounting of the Shaft on the Planer Platen Allowed for Carrying the Shaft in and out of the Propeller Hub as the Fitting Proceeded



Testing Straightness of Shaft, Turning Off Portions Grooved by Stuffing Box Packing, and Providing for Rubber Bands or Sleeves at Joints of Bearings and Casings

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"Stealing in the Factory," a mimeographed seven-page pamphlet designated as survey report No. 11, has been issued by the American Management Association. Methods of avoiding loss from theft are briefly discussed, and standard practice instructions relating to tool accounts with employees, are given.

Standardized Punch and Die Sets Discussed at Meeting of Engineers

Economies from the use of standardized punch and die sets and the advantages from the use of sets commercially available, were set forth by Sidney Diamant, Diamant Tool & Mfg. Co., Inc., Newark, N. J., in a paper on "Commercial Standardization of Punch and Die Sets," presented at a meeting of the Metropolitan section of the American Society of Mechanical Engineers, held April 15 at the Downtown Club, Newark. Liner pins and liner pin bushings were a center of discussion.

Die shoes, sets of liner pins and liner pin bushings, when the latter are not cast integral with the punch holder like boss projections, were cited as the standardized items most readily incorporated in a particular die. Other parts, correlated to these and also readily standardized, including punch plate, stripper plate, die blank, connecting screws and dowels, were not discussed, as most users supply them from their own stock.

The standardized items were said to be invariably the same as to shape, size and method of machining and finishing, although the different size products will group themselves automatically in one or the other standard size die set. Based upon a correct design of the component parts of a standard punch and die set all the machining operations previous to the laying out of the die opening and the making of the punches may be performed on a manufacturing basis, which was emphasized as less expensive than the method of machining the sets in small quantities only as required. The commercial standard punch and die set is brought up to the point of making the punches, cutting the die blank, machining the openings in the stripper and punch plates and providing the necessary stops, springs and minor parts. When the die has reached this stage, it is ready for converting from the genus into the species die, the subsequent work being of a special nature.

Information to facilitate the selection of die sets was given, the width of the strip from which the punchings are to be blanked being said to be one criterion concerning the size of the standard set. The method of securing the set to the press also controls the choice, and the matter of rear or diagonal liner pins and bushings was cited as an important factor.

Of the various factors affecting the selection of standard punch and die sets, it was said that there is none about which there is such a difference of opinion as in liner pins and liner pin bushings. Some companies use soft tool-steel pins running in integral cast-iron bushings or bosses and forming a part of the punch holder, others preferring pack-hardened and ground machine-steel liner pins running in integral cast-iron bushings or bosses. Still others employ both liner pins and bushings made from machine steel, pack hardened and ground. Of those using the steel liner pin type, some prefer oil grooves and others do not.

The advantages and disadvantages claimed for the various types were briefly outlined. A disadvantage of the soft tool steel liner pins and integral cast-iron liner pin bushings was said to be the scoring of the pin and bushing when dirt or grit lodges between them, causing a jam during the motion of the press. Eventually this destroys the fit between them. Felt wipers placed on the lower end of the bushing and arranged to act similar to the packing of a stuffing box gland, was said to largely eliminate this condition. Another disadvantage is the wear on both the pins and bushings when used on presses operating at high speed and over large quantity production. Where the production of a given piece is small and where the design and sale of the product necessitates frequent changes this type of pin and bushing is said to be employed to a large extent.

With pack hardened and ground machine steel liner pins and integral cast iron liner pin bushings, dirt lodging between the pin and bushing will score the latter, but the pins will remain comparatively free from score marks. With the exception of those who adhere to the steel type of pins and bushings, this second type of construction was said to appear to be most popular, permitting of good results on certain classes of work where medium production is desired.

A disadvantage mentioned in connection with pack hardened and ground machine-steel liner pins and liner-pin bushings was that if the pin and bushing freeze the pin or bushing may be pulled out of its bearing support. Greater cost was said to be another objection. Remaining in alinement under most disadvantageous operating condition was cited as the advantage of this type, which is employed for high quantity production, such as when the die is to stamp out 300,000 to 500,000 or more small parts.

Among the advantages said to accrue from the use of standard punch and die sets were the reduction of the designing time and corresponding expense, and the elimination of checking of standard parts for strength and durability. The designer and the tool maker only need to consider the operations affecting the layout of the die proper. It was emphasized that the standard parts of the completed die are less expensive and the finished die available more promptly, the early set up, through stock shipment, permitting competitive advantage in planning, quoting and delivering stamped parts.

D. H. Chason and C. Dulk of the Singer Sewing Machine Co., Elizabethport, N. J.; John A. Honneger and W. MacWilliams, of the Diamant Tool & Mfg. Co., Inc., and S. H. Libby, General Electric Co., Bloomfield, N. J., took part in the discussion.

Meeting of National Association of Purchasing Agents at Boston

At the ninth international convention of the National Association of Purchasing Agents to be held in Boston May 19-23, two conferences will relate to iron and steel, and two to non-ferrous metals. At the iron and steel conference Tuesday, May 20, Walter Sanborn, chairman N. A. P. A. iron and steel committee, will preside. The program will be as follows:

"The Manufacture of Wire and Wire Products from the Purchasing Agent's Standpoint," Dwight L. Granger, of Wickwire Steel Corporation, Worcester Mass.

"What the Iron and Steel Committee Can Do This Year," R. K. Boggs, Andrews Steel Co., Newport, Ky. Discussion led by F. E. Colesworthy, Crompton & Knowles Loom Works, Worcester, Mass.; G. B. Hamblin, Whitin Machine Works, Whitinsville, Mass.; A. A. Frederick, the Oliver Chilled Plow Works, South Bend, Ind.; K. M. Knudsen, B. Greening Wire Works, Hamilton, Ont.

At the non-ferrous conference the same day, the subject will be, "The Statistical Position of the Various Non-Ferrous Metals and the Prominent Factors Entering Into the Prognostication of the Non-Ferrous Market," with C. S. Trench, editor of the *American Metal Market*, as the principal speaker.

At the iron and steel conference Wednesday, the following program will be carried out:

"Where Are We Bound in the Steel Industry?" E. J. Lowry, Hickman Williams Co., Chicago.

"What the Purchasing Agent Should Consider in Buying Pig Iron," John A. Penton, chairman Penton Publishing Co., Cleveland.

"The Steel Industry and the War," Frank Purnell, Youngstown Sheet & Tube Co., Youngstown. Discussion led by D. E. Perry, Hayes Mfg. Co., Detroit; W. G. Langford, Richmond Radiator Co., New York; R. H. Sanderson, E. P. Sanderson Co., Boston.

At the non-ferrous metal conference Wednesday the subject will be, "Recent Advances in the Production of Copper and Copper Alloys." A paper will be read by W. H. Bassett, technical superintendent and metallurgist American Brass Co., Watertown, Conn.

Providence Engineering Meeting

Production milling machines is scheduled as the topic for the designing and drafting section, on the evening of May 6, with Mark Whitehead, chief draftsman, Potter & Johnson Machine Co., Pawtucket, as the speaker.

Germany's High Costs Hamper Industry

Not Likely to Be a Formidable Competitor in World Trade —Prospective Loading of Reparations on Industry —Raw Materials the Greatest Future Need

BY STERLING H. BUNNELL*

THE competition of Germany in the manufacturing field was very much in evidence in the United States before the world war. This affected not only our export trade with foreign countries but also our own domestic market. In spite of our tariffs, large and small metal manufactures, toys, art goods, chemicals and other products sold in competition with domestic goods in the United States, while dyes and other coal-tar products were sold here below the cost of American goods, and on potash and a few other items Germany enjoyed a monopoly.

The war came and passed, without damage to German industrial plants, which were in fact greatly enlarged and improved. A part of the cost of the war to the Allied nations, which had undergone every sacrifice to save themselves and the world from German military subjugation, was assessed against the German people, whose representatives agreed by treaty to pay. But mysterious causes have operated in the last five or six years, so that although German industry has been fairly active, no great portion of the expected reparations bill has been paid. Instead, the German mark proceeded to a complete collapse, and was recently replaced by a fiat paper currency, which has nevertheless retained a fixed purchasing value for the six months it has been in existence.

German Competition With United States

We are naturally interested to know what probability there is of Germany becoming again a competitor of American industry. Sooner or later, the German people must have a stable currency, and their industries will adjust themselves to conditions and begin to operate normally. Without doubt, taxes will then be collected in some way for the benefit of the Allies, and must be paid out of the profits of industry. The German workpeople have shown patience and perseverance since the war as before, and their ability to do a day's work for a reasonable minimum wage is well known.

Germany and World Competition

Will German industry emerge from the present difficult conditions as a formidable competitor in world trade?

In answer to this question, some pertinent facts are apparent to the personal observation of any traveler in Germany; and other and authoritative facts are clearly set forth in the recent report of the commission headed with such distinction by our own General Dawes. There is no doubt of the excellent physical condition of German industrial plants. The necessity for finding work for millions of discharged soldiers and munition makers, and the relative cheapness of wages, always marked up well behind the progressive rise of living costs, led to the building of extensions and the repair and improvement of existing buildings; also there was the construction of national works such as roads, canals and railroad betterments, with Government funds. The merchant ships taken by the Allies were paid for by the Government to the private owners, and the money was used to build new ships, on the most modern lines, oil burning, economically powered, and with every new appliance to attract trade. In this particular Germany is today supplied with first-class ships which run at the minimum cost, while the victorious Allies must operate the excessively large and costly vessels of the pre-war period of competition in size and speed.

As to land transportation, as the Dawes report mentions specifically, the railroads and canals were customarily operated at a loss for the benefit of industry, and the Government made up the deficits. Unless (as the commission advises) this favoring of industry at the expense of the national revenue is terminated, there will be here an advantage to industry in Germany which other countries would have to overcome by lower costs.

German Bonds and Mortgages Wiped Out

Industrial works generally have to provide out of income for certain fixed charges on the invested capital. Bond interest comes first in urgency, dividends on preferred stock next. In Germany, almost all bonds and mortgages have vanished. There was a good deal of talk just after the war, in all countries, about the enormous national debts and the possibility of their repudiation. The fall of the German mark to one-millionmillionth of its par value effectually repudiated all debts payable in "marks," and along with all the public and private debts went the national and municipal bond issues, and even the nation's obligations in the form of currency.

The result was a huge shifting of ownership of property. All trust funds and ordinarily "secure" investments were wiped out, in favor of the holders of the actual titles to the properties, or the stock interests which carried fractional parts of the ownership. No tangible property has been lost. Factories and plants exist as before, but are now in the hands of the speculators who saw the coming events and borrowed to their limit to buy the title to properties, then paid their debts with cheaper money.

Industry as the Mark Sank

It must not be supposed that this was an easy and simple process, which any fool could carry out. It took two things to make a successful speculator—credit and

*Consulting engineer, New York.

MR. BUNNELL made a business trip to Germany recently and his observations there are in large part the basis for the present article. His view is that German manufacturers will not be formidable competitors in international trade, citing the burdens imposed on industry under the plan of the Dawes commission, the high cost of such materials as must be imported, and the tendency of wages to approximate those in France and England. While salaried workers and wage earners have been seriously underpaid, it is recognized that this condition cannot continue long. Industry must bear the burden of reparations and that means that prices of the products Germany has to sell will advance.

courage—and both in an uncommon degree. Few indeed of the millions of the German population were able to hold cards in that game and stay long enough to capture the big pots. But as the winners acquired property in the form of industrial plants, they also acquired heavy responsibilities. There was discontent enough with the results of the shifting of ownership, and at any cost the workmen had to be supplied with work to do, and with wages marked up often enough to keep not impossibly behind the advancing prices of necessities.

If the factory owner sold the products ahead, at the time of delivery the set price was always far behind the market. Or, if he made up goods on borrowed money, it was easy at the time of sale to get a price far in excess of cost; but this apparently large profit was fictitious, because the raw materials must be replaced at still higher cost in cheaper money. German cities were full of foreigners living for almost nothing by the advantage they gained in changing their money for depreciated marks. But the gain to the nation by the influx of other and more valuable currencies was more than offset by the loss from selling goods which could not be replaced except from foreign raw materials at still higher prices.

The condition became more intolerable, most intolerable, and finally—intolerable. When prices were being marked up every few minutes, and a man's wages lost nine-tenths of their purchasing power before he received them, the nation was in a mood to accept as money any kind of a counter or coupon, if it only could have a definite and fixed purchasing value.

Effect of the Rentenmark

The Government then put out a new paper mark, the "rentenmark," first in the denomination of 4.20 marks, stated on the note to be equal to one American dollar. There were also fractional notes equal to one-half dollar and one-quarter dollar. Later, even one, five, ten and other rentenmark notes were issued. Although absolutely fiat money, these notes have for six months kept their exact purchasing value; and today German internal business is done with these blue and white chips. For the present, the Government expenditures are set to come within the receipts, which means among other things that high officials and university professors receive salaries of only $50 to $75 per month. As no rentenmarks are allowed to be sold outside Germany for foreign moneys, there is no active influence tending to reduce the value of this fiat currency, and the situation is, as some scientific mind has stated it, a condition of equilibrium, but of the "unstable" order, which the slightest touch may destroy.

But since the stabilization, such as it is, all salaried workers and wage earners are very seriously underpaid. This state of affairs cannot continue long, and none know it better than the employers and owners of plants. The peace treaty trimmed off the best of the German coal and iron mines. Fuel, already very costly, became even more scarce after the occupation of the Ruhr. Great efforts are being made to supply the deficiency by lignite peat and wood. Raw materials, which must come from outside Germany, must be paid for by foreign money, and for this purpose balances in foreign banks were built up by export trade, where that could be arranged. The uncertainty about replacing these balances by continued export trade restricts the purchase of needed materials. This is probably the reason for the present small purchase of American copper by Germany.

Prices Now High, Wages Low

Credit in Germany now hardly exists at all; there are no funds on deposit in German banks to serve as a basis. There is considerable foreign currency in Germany in the hands of citizens, but by no means sufficient or available to pay wages and do other duties of local currency. Prices, now on the nominal American or gold basis, are about as high as in the United States, and salaries and wages are roughly a fifth of ours. The one item in the workmen's favor is the low cost of house rent, limited by war and post-war emergency laws, and the saving here was for a long time about equal to the increase in food cost; but it is so no longer.

Business in Germany is accordingly very dull. In order to go into active production, stocks of fuel and raw materials must be obtained, and this must be done on credit. At present there is a great scarcity of money. The foreign capitalists who invested money freely in German goods when exchange was such that they could buy everything for almost nothing, have transferred their attentions to other countries. They were fast buying out France, when the franc was supported by bankers deeply involved in the situation and the tide turned. Such German liquid capital as there is has passed into the hands of private owners and speculators, who do not want to tie it up in time loans, but lend from day to day and demand interest at rates of 24 to 36 per cent per annum. A settlement of the reparations problem, so that the owners of German industries will know definitely the rate and method of taxation, and be assured that capital in German banks will not be seized as the first thing in sight, while capital in foreign banks escapes, presumably will bring about the return of German bank deposits and permit the extension of commercial credit at necessary and normal rates.

Industry and Reparations

Industrial Germany necessarily must carry the direct burden of paying the reparations bill. This the Dawes report clearly recognizes. The reparations scheme went to wreck because of the requirement that the huge payments should be made in gold or the paper equivalent of gold, which equivalent grew with every new purchase of foreign exchange by Germany. France and Belgium could not accept goods, because the work of making such goods was needed to reduce their own local unemployment. Germany has no agricultural products to export, and can only obtain foreign exchange by the export of manufactures and the sale of services such as ship transportation. The trade balance, which alone is available to pay reparations, necessarily will vary from time to time; and any attempt to pay in excess of a favorable trade balance must depress the value of German currency, and by the resulting disturbance cause a business depression and consequently cut off income and stop further payment entirely.

The fact that taxation to supply the Government with funds is one problem and that the transfer of the funds to a foreign country is quite another must have been well enough known to business men in all countries concerned; but the Dawes Commission has been the first authority to make practical use of the knowledge in working out a solution for the reparations impasse. General Dawes (one cannot refrain from crediting him personally) proposes to collect the amount of the reparations payment, but to deposit it in marks in a special bank in Germany, to the credit of the several Allied nations interested. The owners of the deposits will be allowed to draw their money only as the condition of exchange shall permit; they cannot sell their marks so as to wreck the value of the currency. They may, if they desire, invest the money in Germany instead of taking it out, which means that they can buy German goods and export them, or they can buy German industrial property or securities and draw the profit or interest as it accrues.

The payment of the reparations bill, as said before, must rest entirely upon German industries. The commission says that railroads must be operated at a profit, and the profit paid over to the reparations fund. This means higher freight rates, which will fall principally on industries. The commission calls attention to the disappearance of all bonded indebtedness of factories, relieving them of fixed charges and so reducing costs; and it proposes to reimpose mortgage bonds on industries, the interest to be paid to the reparations fund. These two burdens will put German factories on an equality with other countries to this extent.

Manufacturing Costs Not Far From England's or France's

There remain the items of raw materials and labor costs. Labor in the long run must be paid a living wage. Apparently this cannot be much if any below the standard of England or France, as food and other

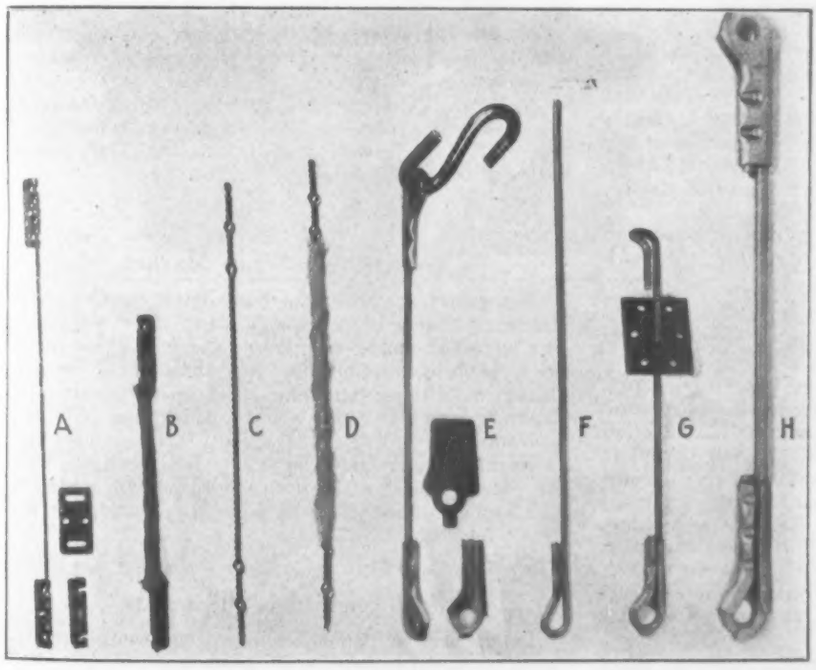
necessaries cost about the same or are produced under about the same conditions as in these countries. It seems probable that manufacturing costs in all these countries will be nearly the same.

As for materials, Germany is not rich in natural resources, such as metals. Lignite can take in part the place of the lost coal. Iron ore and various metals must be bought abroad, and all such purchases cut down the trade balance available to pay reparations. The obtaining of the raw materials of industry will be the most powerful incentive to international alliances in future. In the present temper of the world, the nations will hardly tolerate any attempt by one to seize from another by force of arms, territory containing useful minerals. Nevertheless, international strife will go on, but probably under the rules of trade instead of war; so that we may look for control of foreign mines, oil wells and other natural resources by investment, as is indeed already apparent.

Whatever the details of the final solution of the reparations question, Germany eventually must be a large purchaser of raw materials, and to that extent a customer of the United States. It must not be forgotten that against international selling there must be equal purchasing; so that German manufactures, or ship transport, or other service, must tend to compete with our own. But it is difficult to see any possibility of manufacturing costs in Germany again becoming low enough to compete seriously with the industries of the United States.

Lashings and Tie Rods Equipped with Clip Fasteners

Lashings and tie rods with metal clip fastenings that are claimed to withstand greater tensile stress than the wire, the wire not pulling out of the clips, have been placed on the market by the Blakely Mfg. Co., Fullerton Avenue and Monnier Road, Detroit. The wire is crimped and reinforced with the metal clips formed, in the case of the smallest wire, to be fastened with nails and on the larger wires, to be fastened with bolts. These devices are adaptable to a variety of uses, including the shipment of automobiles and parts.



Lashings and Tie Rods Equipped With Metal Clip Fastenings and Adaptable to a Variety of Uses Including the Shipment of Automobiles and Parts. The clip lashing shown at *A* is used for fastening windshields, tops and other loose parts. The tie rod of No. 6 wire, shown at *E* with clip assembled on each end, has a tensile strength of approximately 2000 lb. Rods with a clip on one end and floor plate on the other as at *G* are also available

What is called the clip lashing, shown at *A* in the accompanying illustration, has been used in shipping automobiles, for fastening windshields, tops and other loose parts on the inside of freight cars or export cases. The wires are passed over the part to be held in place, nails are driven through the end holes in the clips and then nails driven through the inner holes, which automatically draws the wire tight. This lashing was designed to replace the twisted wire shown at *C*, and is available in No. 14 and No. 15 wire, in any length and either bare or padded as at *B*. The twisted wire and method of padding shown at *D* is patented and has been in use for several years, but the clip lashing for which patents have been applied, is a new product.

A tie rod with the loop made and crimped before assembling with the clip is shown at *F* and a tie rod of No. 6 wire with clip assembled on each end is shown at *E*. The tensile strength of the latter is given as approximately 2000 lb., the "S" hook of ⅝ in. diameter wire when attached to the sample as shown and pulled, being straightened out. Another type of rod available is equipped with a clip on one end and a floor plate on the other, as shown at *G*. This floor plate is the same as used on all of the company's hold-downs or fastenings and has been used in large quantities for the shipping of automobiles. The rod shown at *H*, which will be recognized as of the same type as that at *E*, has a breaking strength of approximately 7700 lb. and is the largest at present available. Tie rods made up of No. 6 wire as at *G*, and having a bolt clip at one end to take an "S" hook, and taking a 14 gage floor plate 1¾ x 2¼ in. on the other end have been used as guys in the shipping of automobiles.

It is pointed out by the makers that in the case of a long truss rod threaded at both ends, the strength of the rod is only that of the diameter at the root of the thread. To equal the strength of the tie rod shown at *H*, which is of ⅜-in. (0.375 in.) wire, a threaded truss rod of 15/32 in. (0.467 in.) would be required, the difference in weight between the two being 0.211 lb. per ft. or a saving of 211 lb. in every 1000 ft. in favor of the tie rod shown, to give equal strength.

Life insurance protection has been provided for 104 employees of the Plainville Casting Co., New Britain, Conn. The amount of insurance is $1,000 each and health and accident insurance is included, providing for payment of $10 a week over a period of 13 weeks. The employees contribute part of the premium, while the company pays the rest. The insured workers are eligible to the nursing service maintained by the insurance company.

REDUCED STEEL PRODUCTION

Finishing Mill Schedules, However, Make Good Showing in Mahoning Valley

YOUNGSTOWN, April 22.—Basic departments of Mahoning Valley iron and steel plants are on a reduced operating basis, as compared with last week, but finishing mill schedules are averaging well.

Further curtailment in blast furnace operations has been occasioned by the withdrawal from production of No. 5 stack in the Haselton group at Youngstown of the Republic Iron & Steel Co. This suspension reduces the active blast furnaces in the Youngstown district to 31 of 45.

Ingot production is not averaging above 70 per cent for the Valley. At its Ohio Works plant the Carnegie Steel Co. has cut its open-hearth operations to about 65 per cent. Of 66 open-hearth furnaces in the Mahoning Valley 38 are melting, including 28 of 51 independent units. All Bessemer plants are operating, but at a reduced rate, estimated at 75 per cent.

The Sheet & Tube company is continuing its schedules this week with little change. The Republic company has suspended its plate mill and has two light bar mills inactive. The Trumbull company is operating five of seven open-hearth furnaces, and its finishing departments are averaging 65 per cent. This company has suspended 10 of its tin mills.

Of the Valley independents, the Sharon Steel Hoop Co., with plants at Youngstown and Sharon, Pa., is averaging higher in all departments than any other interest.

The A. M. Byers Co., Pittsburgh, is averaging 75 per cent at its Girard plant.

The active sheet mill schedule is more elaborate than last week, but orders were insufficient at the beginning of the week to maintain the sheet mill production at this rate for even the whole week. Of 120 sheet and jobbing mills in the Mahoning Valley 93 were scheduled Monday for rolling.

Non-integrated sheet rollers are especially anxious to secure new tonnage, and competition for business is keen.

Manufacture of Bells

Department of Commerce figures, based on the 1923 census of manufactures, show a production in nine establishments of $755,614 of bells and $36,522 of other products. This compares with $613,770 and $31,391 in 1921, with the same establishments. Wage earners averaged 218 against 203, and total number of persons engaged were 250 against 240. Salaries and wages amounted to $267,606 against $256,757, and the value added by manufacture was $464,541 against $367,952, an increase of 26.3 per cent. The nine establishments are located in Connecticut, Illinois, Missouri, New York and Ohio.

Buyers Still Hesitate in the Mahoning Valley

YOUNGSTOWN, April 22.—Mahoning Valley steel makers say that new business is still hesitant, attributed in large measure to uncertainties arising from political developments, and price unsettlements in wake of weakened demand. Much current buying is of the hand-to-mouth variety, especially in the sheet market. In most cases, sheet producers do not make up schedules for the following week until the last of the preceding week, being guided altogether by what business accumulates from day to day. *While some of the smaller makers are obliged to recede from schedules announced at the beginning of the week, a major independent reports it has not yet been compelled to effect such curtailments.*

One of the leading Valley independents reports current new business approximates 62½ per cent of the tonnage being currently shipped, while the aggregate of specifications issued against both new and old contracts equals 75 per cent of shipments. With others, the percentage of new business as compared with shipments is less, prefacing a further reduction in production schedules.

In this district, demands for pipe lead other finished steel products. There is less urgency to the requirements for buttweld sizes of steel pipe, but nevertheless orders are in sufficient volume to absorb virtually all the output of Valley mills, and little pipe in the merchant sizes has been stocked. The demand, likewise, for lapweld pipe has been fairly well sustained, though more of this class of production has been going into warehouses.

Finds Improvement Needed in Specifications for Nick-Bend Test

The nick-bend test as it now stands in most American specifications for wrought iron is nearly meaningless, according to the Bureau of Standards, and should be either eliminated or re-defined. This test consists in nicking the bar with a chisel and then breaking it off at the nick. The appearance of the fracture is taken as an indication of the quality of the iron, and nearly all specifications for wrought iron include such a test, the "crystallinity" of the fracture being the criterion by which the material is judged.

Most American specifications were found to be rather lax as to how the specimen should be broken, permitting it to be broken either by pressure or by blows. The tests made at the Bureau of Standards showed that the appearance depends to a very large extent on the manner in which the specimen is broken, while the character of the iron has less effect. A definite specification covering this point is therefore recommended.

These tests are described and the conclusions given in technologic paper No. 252, which may be purchased from the Superintendent of Documents, Government Printing Office, Washington, for 10c. cash.

Youngstown Scrap Market

YOUNGSTOWN, April 22.—Scrap metal market in the Mahoning Valley is in the doldrums. Steel producers who were consuming scrap in a large way earlier in the year in connection with iron output are now producing in finishing mills enough scrap for their open-hearth furnaces, bringing about a substantial reduction in demand.

In this district dealers say there is virtually no market. Heavy melting scrap is pegged at $16 minimum. Any buying volume would likely send prices higher, say middle interests.

Steel Furniture Shipments

Department of Commerce figures show March shipments of steel-furniture stock goods amounting to $1,661,303, compared with $1,605,409 in February, $1,592,338 in January, and with $1,709,206 in March of last year. Except for this latter figure the current figure is the largest for more than two years.

"Carbon Monoxide Poisoning" is a brief pamphlet of 16 pages by Dr. Frank S. Rossiter, Carnegie Steel Co., Rankin, Pa. Most of the data are from the latest articles on the subject written by the author, based also on 13 years' personal experience as company surgeon for the company during which time over 1000 cases had been treated.

For photographing specimens of corroded pipe a camera has been designed in the Bureau of Standards photographic laboratory. Negatives show the entire surface of the pipe in one continuous piece. It is expected that the camera will play an important part in the soil corrosion work now being carried on.

NEW 36-INCH ENGINE LATHE

Eighteen-Speed Geared Head—Twelve Speeds Through Face Plate Drive—Other Improvements

A new model 36-in. heavy-pattern lathe, designated as the Super-Productive and said to have been designed with a view to provide a lathe sufficiently in advance of present requirements to assure adequate capacity for future demands, has been brought out by the American Tool Works Co., Cincinnati. Its power, weight, dimensions, materials and refinements are general features emphasized by the makers.

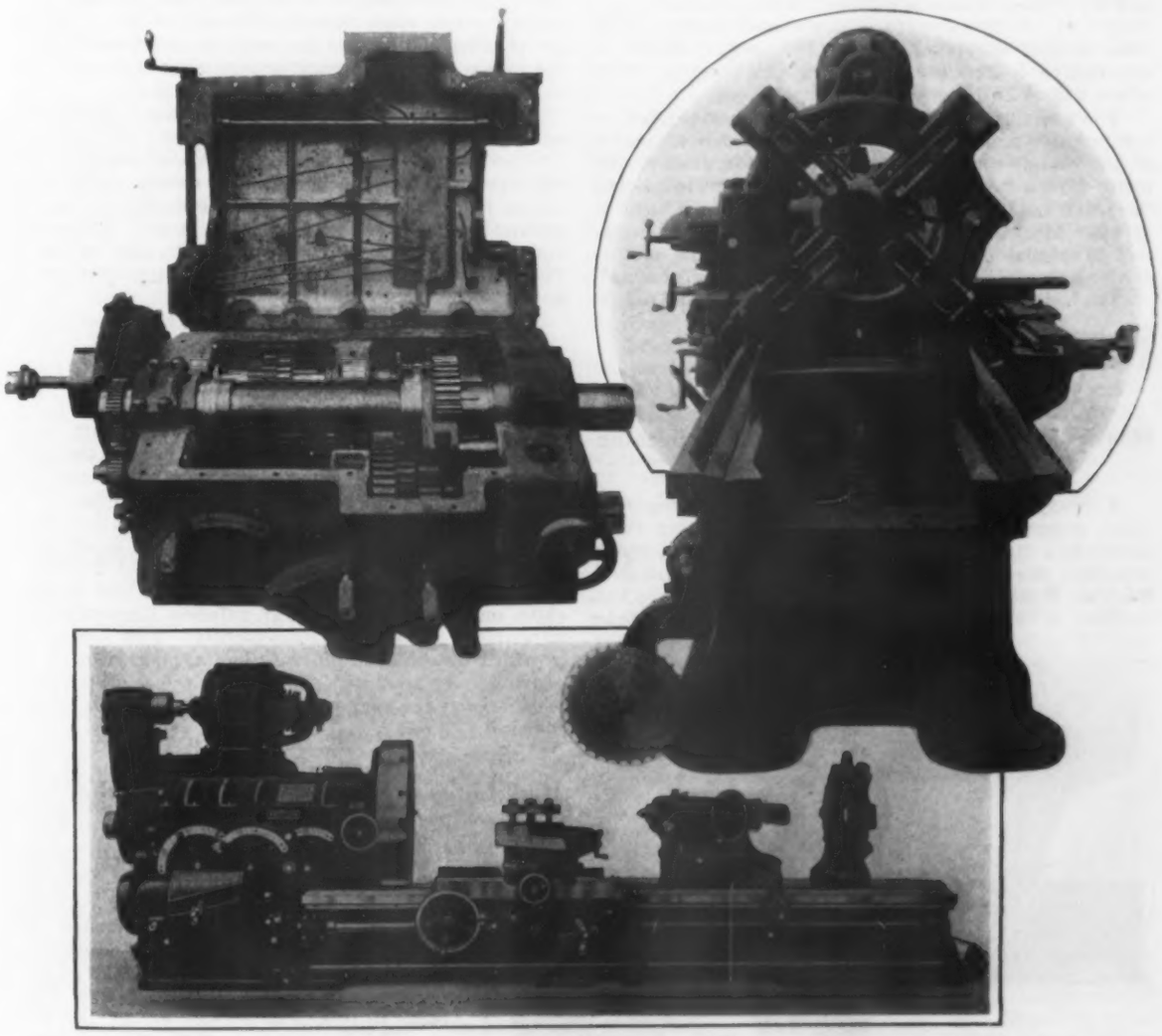
The 18-speed head, a feature particularly emphasized, is of the all-geared selective-speed type having both spindle and face plate drives, and may be either belt or motor driven. When belt driven 35 hp. is delivered to the driving pulley. For the motor-driven lathes, motors from 25 to 40 hp., depending upon the nature of the work, are recommended.

An improvement considered as of outstanding importance is the new face plate drive. The new design provides 12 of the 18 spindle speeds through the internal gear face plate drive, only one-third or six spindle speeds being transmitted through the spindle gear. Thus, for severe turning operations the drive is through the internal gear in the face plate. Twelve speeds, up to and including 32½ r.p.m. are available through the internal gear, the maximum speed providing approximately 50 ft. cutting speed on a 6-in. diameter. Thus, turning operations on diameters 6-in. or larger may be performed through the internal gear drive at 50 ft. or greater cutting speed, the direct drive through the spindle being used only for comparatively light operations at high speeds.

The 18 spindle speeds are obtained through 16 gears, including the face plate internal gear and pinion, without the use of either friction or jaw clutches. Speed changes are made through slip gears, the only ones in operation at any time being those that are transmitting power.

The head may be arranged for adjustable-speed motor drive, in which case six mechanical speeds may be provided.

Gears in the head, including the triple gear and face plate pinion, are of high-carbon chrome-manganese steel heat-treated and, excepting the face plate internal gear, are hardened. After hardening the bores are ground concentric with the pitch diameter and it is claimed that the pitch lines of the gears will run true within one half-thousandth of an inch, even on the largest gear. The tensile strength of the gears is said to average 200,000 lb. and the Brinell hardness 385. The method of heat treatment employed is said to produce gears of tough core as well as with an extremely hard surface. The bending of one tooth against the other with a sledge hammer without fracturing them is pointed to as illustrating the characteristics of these gears. The spindle and other shafts in the head are of high-carbon alloy steel, heat treated before machining. The



Heavy-Pattern 36-Inch Lathe with 18-Speed Geared Head for Belt or Motor Drive. Twelve of the spindle speeds are through the internal gear face plate drive. The internal mechanism of the head and the construction of the bed may be noted from the views above

spindle and shafts run in a special phosphor bronze.

The automatic oiling system incorporated in the company's smaller lathes is employed also in the new head. Oil is pumped from a reservoir at the bottom of the head to a distributing chamber in the top cover, and is filtered through a felt pad in the distributing chamber before it reaches the bearings. It then drops into small reservoirs, from which it is fed through tubes to the various bearings, each tube having its own reservoir. Overflow from the distributing chamber serves to lubricate the gears. The oil then drains back to a settling basin, the overflow of which passes to a filtering chamber from which it is again pumped to the head.

The driving motor is mounted on top of the headstock and connected to the initial driving shaft by herringbone gears, which are of steel forgings. These gears run in oil. A flexible coupling between the motor and the driving pinion is intended to compensate for end movement of the armature shaft, and assure quiet running and minimum wear. The motor pinion is mounted on double-race self-alining ball bearings. The whole unit is entirely inclosed.

The starting clutch and brake are incorporated in a detachable unit, which is located in the driving pulley of the belt-driven lathes or in the motor gear of the motor-driven machines. The unit is fully enclosed, and the clutch and brake mechanism operates in a bath of oil. Mechanical apron control for operating this unit is regular equipment. For variable speed motor-driven lathes electrical apron control may be provided.

The bed of the machine has been widened and otherwise strengthened, the center distance between the carriage Vees having been increased from 26 to 31¾-in. The center distance between tailstock Vees has also been increased. The increased width is intended as a particular advantage if it is desired to increase the normal swing of the lathe by raising the centers. The carriage bridge also has been widened from 13 to 16-in.

The tailstock has been straightened and improved. The spindle adjusting handwheel has been placed in a more convenient position, near the front or left-hand end of the tailstock, and is connected to the spindle through an angular shaft and bevel gears. This arrangement is intended to provide more convenient control of the spindle in centering the work and in boring operations.

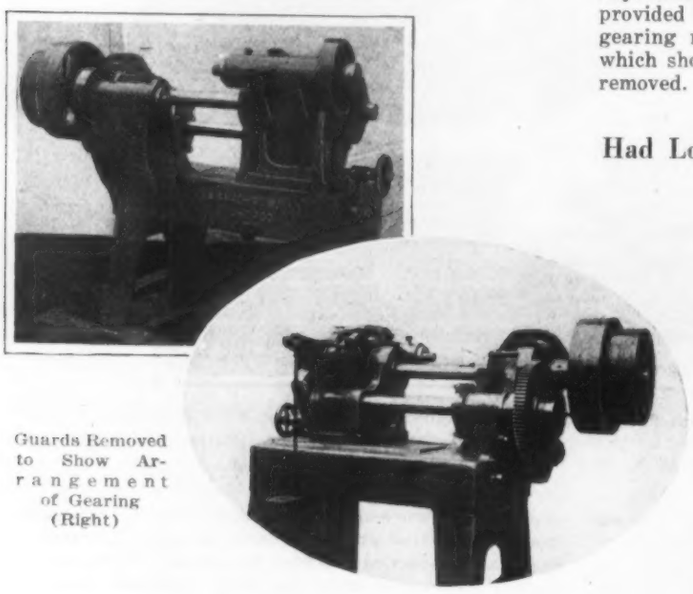
Carriage power rapid traverse mechanism is not regularly furnished, but is offered as an attachment. The rack pinion may be withdrawn from the rack when cutting coarse pitch threads. The pinion has a bearing on its inner end beyond the rack, avoiding overhang of the pinion. The feed rack is 2-in. wide, 4/5 pitch, and is of high carbon, heat-treated material.

Other features on the new machine are in accordance with the company's established practice.

The swing over the bed is 40½-in. and over the carriage, 27½-in. The 18-spindle speeds range from 1.82 to 157 r.p.m. The thread and feed changes number 48, and the feeds per inch from 3.5 to 196. The power angular traverse to the compound rest is 15-in. The net weight of the complete machine with 12 ft. bed is 23,050 lb.

Heavy Machine for Beading and Trimming Drawn Shells

A heavy-duty beading, curling and trimming machine, designed for use in beading and trimming automobile hub caps, radiator caps and other drawn shells and cups, has been placed on the market by the S & S Machine Works, 4522 Lexington Street, Chicago. The machine is rated to bead and trim brass shells up to



Guards Removed to Show Arrangement of Gearing (Right)

10 in. in diameter and of ⅛ in. thickness of metal.

The arrangement of the component elements of the machine may be noted from the accompanying illustrations. Unusually heavy construction is a feature claimed. The spindles are 2⅛ in. and the main shaft 2¼ in. in diameter. The width of the driving belt is 4 in.

The spindles run constantly. In operating the machine the work is placed on the chuck and the foot pedal depressed, the pedal operating a clutch on the back shaft. A cam, also mounted on the back shaft, automatically swings an arm casting which carries the beading and trimming roll into contact with the work. The cam gradually applies the pressure and then moves the roll away from the work, the back shaft finally coming to a stop and remaining so until the pedal is again depressed.

A threaded adjustment is provided so that the machine may be set for work of different diameters, this adjustment being made conveniently. Two speeds are provided by the cone pulley. The arrangement of the gearing may be noted from the insert illustration, which shows the rear of the machine with gear guards removed.

Had Longest Service Term of All the Steel Corporation's Veterans

Because the Worcester works of the American Steel & Wire Co. is scrapping most of its steam engines and replacing them with electric motors furnished with current from the hydroelectric stations of the New England Power Co. on the Connecticut and Deerfield rivers, Henry Engel leads in length of service among the more than 4,000 pensioners of the United States Steel Corporation. His engine was one of the eleven that has gone to the junk heap and he retired with it.

"I helped to set up that engine," he said, "and I helped to take it down. The last piece of it has gone and I'm going with it." So, though only 66 years old, Mr. Engel takes his place at the head of the list of retired veterans of the Steel Corporation. His continuous service was 56 years, nine months and four days. He entered the employ of the North works of the Washburn & Moen Mfg. Co., May 21, 1867, when he was nine years old, and worked his twelve hours a day in what was known as the steel room. He became an engineer at the North works, was transferred to the South works to take charge of the rolling mill engine, and when the new wire mill engine was installed in 1902 he was given charge of it, remaining with it until it had to make way for the advent of electric power.

COMMISSION IS SUSTAINED

Trade Secrets Protected by Decision of District of Columbia Court

WASHINGTON, April 22.—Facts relating to cost of production and similar information gathered by the Tariff Commission constitute trade secrets, and therefore, the commission is acting within its rights in refusing to divulge such data which it obtains in the course of its investigations. This is the gist of an opinion announced here last Friday by Justice Siddons of the Supreme Court of the District of Columbia. The ruling upheld in every respect the Tariff Commission in refusing to disclose information regarding costs of production obtained from the American Nitrogen Products Co., of the State of Washington, and was a defeat for the Norwegian Nitrogen Products Co., Inc., New York, which had instituted mandamus proceedings to force the commission to reveal this information. It was gathered in connection with an investigation growing out of a petition filed with the commission by the American Nitrogen Products Co., which is asking for an increase under the flexible provisions of the tariff law in the duty on sodium nitrate.

When the commission declined to disclose information to the Norwegian Nitrogen Products Co., on the ground that it was forbidden by law to divulge trade secrets, Attorney Marion DeVries, representing the Norwegian company, filed the demurrer to the answer of the commission and Justice Siddons overruled the demurrer.

It was pointed out by Justice Siddons that the commission is exclusively an investigating and fact-finding body and that the results of the information it obtains are intended principally for the information of the President and of Congress. The commission is required on all occasions, the courts declared, to afford public hearings, but it was said that this fact has not changed the essential character of the commission. In the usual sense of the term, the court maintained, there is no property right in the existing tariff duty. On the contrary, Justice Siddons said, the tariff duty is at all times subject to the will of Congress, which is at liberty to place the article in question on the free list. It was declared that information sought by the Norwegian company was of a confidential nature and to divulge it would reveal trade secrets, and the fact was stressed that such secrets have been carefully guarded by the courts and the law. This phase of the opinion elicited a great amount of interest because of the emphasis it placed upon the necessity of protecting business of the country against having to make known secret trade information to their competitors.

The Norwegian company itself, the court said, had refused to give to the tariff commission the information as to its business but it endeavored to obtain such information as it applies to a competitor. The opinion was expressed by Justice Siddons that trade secrets include the cost of production figures as contended by the commission, and that the cost of production may vary in proportion to the skill and acumen of individual manufacturers. The manufacturer, it was said, whose skill has lowered the cost of production from that of his adversary has an advantage which in fairness he may be said to have earned and should be concealed from his competitor.

Attorney DeVries has previously pointed out that the case will prove a test as to the authority of the Tariff Commission and its power to operate under the flexible provision. This was one purpose of instituting the suit and Mr. DeVries said that it is proposed to carry the case to the Supreme Court, if necessary.

HEAT TREATING CAST IRON

Schaap Method Examined by the Bureau of Standards

The method of heat treating cast iron, described in THE IRON AGE, Jan. 3, 1924, in an article by Prof. Bradley Stoughton, entitled "Tying Knots in Gray and White Cast Iron," has been tried recently by the Bureau of Standards. Small samples only were used and the investigation was applied merely as to the effect on microstructure. It is stated in an article in *Chemical and Metallurgical Engineering* that a microstructure similar to that attained by the Schaap process was successfully produced without the use of the wrought iron muffle described as essential in the article referred to.

Specimens of stove plate were held at 760 deg. C. for 15 min. in an electric furnace in air. A similar anneal at 820 deg. C. gave similar metallographic results. The analyses of the unannealed specimens were as follows:

	Per Cent	Per Cent
Total carbon	3.55	3.42
Graphitic carbon	2.95	2.81
Combined carbon	0.60	0.61
Silicon	2.31	2.30
Manganese	0.51	0.47
Phosphorus	0.72	0.70
Sulphur	0.07	0.11

"The pearlitic cementite of the particular gray iron used is almost completely graphitized by the short anneal, so that the specimen shows practically free graphite in a matrix of ferrite. Etching is required to show this, as unetched specimens could scarcely be distinguished from the unannealed material. Such a microstructure is, of course, consistent with the claims made for machinability and for a small degree of ductility, but the specimens annealed at the Bureau of Standards and the Schaap specimens with which they were compared were all too small for mechanical testing."

The Bureau of Standards points out that however valuable the Schaap iron may prove on the score of machinability or for special and specific uses where the very limited degree of ductility and toughness apparently developed by the short-time anneal may be useful, the product is still from the point of view of a material of construction in the cast iron class. That is, it is still an essentially brittle material as contrasted with truly tough and ductile alloys.

The question is also raised whether, after a "Schaap anneal," the mechanical and machining properties might not be largely determined by the phosphorus content, since the steadite does not appear to be affected by the anneal.

Large Sugar Mill Plant to Be Built by Honolulu Iron Works in Cuba

SAN FRANCISCO, April 16.—A private cable received here this morning from Honolulu says that the Honolulu Iron Works has been awarded a contract for $2,000,000 to build what will be the largest sugar mill plant in the world in Cuba. It will have a grinding capacity of 3800 tons of sugar cane daily. Three bids were submitted and they were singularly close, considering the large amount involved. It is hoped to have the work completed before the close of the present year. New York capital is said to be interested in the new enterprise.

Mr. Rastall Going to Europe

WASHINGTON, April 22.—W. H. Rastall, chief of the Industrial Division, Department of Commerce, expects to sail for Europe early this summer to study machinery markets abroad. An announcement by the department says that Mr. Rastall will be glad to hear from machinery manufacturers having special problems in Europe and Asia. Mr. Rastall expects to visit most of the countries of Europe west of Russia and south of Denmark before returning to the United States in the fall.

Sales of mechanical stokers in March covered 89 rated at 34,597 hp. against 110 rated at 62,113 hp. in February and 91 rated at 66,492 hp. in January. The monthly rate in horse power in 1923 was 60,870 hp.

Professor Honda Addresses New York Steel Treaters

An unusual treat was in store for those members of the New York Chapter of the American Society for Steel Treating who attended the monthly meeting of the chapter in the rooms of the Merchants' Association, Woolworth Building, Wednesday evening, April 16. K. Honda, Japan's leading metallurgist and one of the outstanding authorities in that field in the world, delivered a brief address on "Transformation." It was delivered in English but was somewhat difficult to follow. He dealt with the controversy as to the relations of alpha, beta, gamma and delta iron and propounded, by means of charts drawn on a blackboard, some of his own views on the subject. Dr. Edgar C. Bain, Dr. Ansel St. John, Dr. Paul D. Merica and Dr. John A. Mathews all briefly discussed Professor Honda's address and bore testimony to his standing among metallurgists of the world. The meeting was preceded by an informal dinner at which Professor Honda was a guest.

Another address presented the same evening was delivered by Arthur W. F. Green, metallurgist John Illingsworth Steel Co., Philadelphia, who, in an entertaining manner, recounted many of his experiences in coming in contact with some unique and anything but scientific methods of heat treating steel in his efforts to prove to the user that the product of the steel maker is "always right."

Scrap Dealers, Producers and Users Join

The Scrap Steel Consumers and Shippers Conference is the name of the new organization which is being formed by producers, users and dealers in scrap in the West. This body will deal only with traffic and transportation matters and in addition to promoting a more friendly feeling between the shippers and the carriers, will endeavor to serve its membership in solving general traffic problems. Among its proposed functions will be to represent the industry before the Interstate Commerce Commission, the State public utility bodies, and railroad rate committees. The executive committee of the organization comprises R. K. Keas, traffic manager, Laclede Steel Co., St. Louis, who will act as chairman; P. M. Hansen, National Enameling & Stamping Co., Granite City, Ill., vice-chairman, and E. S. Tompkins, St. Louis Screw Co., St. Louis, treasurer. A committee on transportation has been formed, including A. L. Dreher, Hyman-Michaels Co., Chicago, and H. Mueller, traffic manager Standard Rail & Steel Co., St. Louis. The organization is not for profit and membership dues are $5 a year. Headquarters are at the office of the chairman of the executive committee, 1317 Arcade Building, St. Louis.

Chicago Machinery Club Elects

New officers elected by the Machinery Club of Chicago at its seventh annual meeting on April 15, are as follows: President, H. S. White, Cleveland Twist Drill Co.; vice-president, F. L. Kohlhase, National Stamping & Electric Works; treasurer, H. J. Reeve, Reeve-Fritts Co.; secretary, R. W. Barry, Drying Systems, Inc. The club now has a membership of 936 and during the past year expanded its quarters by an addition of 30 per cent in floor space.

Takes Over Avondale Stove & Foundry Co., Birmingham, Ala.

BIRMINGHAM, ALA., April 22.—In taking over the plant and purchasing 10 acres of land adjacent to the shops of the Avondale Stove & Foundry Co., in this city, the Jacobs Stove Co., Bridgeport, Ala., proposes not only to bring its patterns and other equipment to Birmingham and start up the operations of the old plant here, but also to enlarge and develop until it has one of the largest stove works in the South. It is expected that within 60 to 90 days the Avondale plant will not only be started, but a large part of the proposed enlargement will be under way.

This makes the fourth stove works in Birmingham. Recently the Birmingham Stove & Range Co. enlarged its plant by adding a shop for the manufacture of gas ranges. The district here is showing great progress as a consumer of pig iron. The stove works just taken over by the Dortch interests will ultimately give employment to 250 men.

New York Central Railroad Buys Fabricating Shop

BUFFALO, April 22.—The Stanley street fabricating shop belonging to the Bethlehem Steel Co., and erected in 1917 by the Lackawanna Steel Co., has been sold to the New York Central Railroad Co. for $350,000. The buyer will use the property as a car repair and paint shop.

The plant which has a frontage of 268 ft. on Stanley street and 516 ft. on the New York Central right of way, covers a total of 15 acres. Since the purchase of the Lackawanna works by the Bethlehem company, the plant has been in disuse, as it was found to be located too far from the Lackawanna mills to make operation an economical one.

The main building has 91,340 sq. ft. of floor space. There is also an office building containing 6,240 ft. of space, a gate office, garage, shipping office and paint shop. There is 2500 ft. of standard gage railroad and 1,000 ft. of narrow gage track. The property's appraisal value was $553,000.

Republic Iron & Steel Co. Earnings

The Republic Iron & Steel Co., first of the large steel companies to make public an income account for the first quarter of 1924, reports net gain from operations, after deducting charges for maintenance and repair and provision for Federal taxes, of $2,080,810. Net profits after depreciation, renewals and interest, were $1,356,158, equivalent after preferred dividends to $3.06 per share earned on the $30,000,000 common stock. This compared with net profits of $1,533,843 for the corresponding period of 1923.

Surplus after dividends for the period reported amounted to $668,658, against $1,096,343 for the first quarter of 1923. An increase of $150,000 in dividend payments on preferred stock was due to the declaration of 1 per cent extra dividend. A pleasing feature of the report is the gain in unfilled orders. On Dec. 31, 1923, unfilled orders of finished and semi-finished material amounted to 68,955 tons; on March 31 the figure was 116,759 tons.

Birmingham Tank Co. Will Enlarge

BIRMINGHAM, ALA., April 22.—The Birmingham Tank Co., of which R. I. Ingalls is president, is to be enlarged and developed so that it will be not only the largest tank and plate shop in the South, but will make a good showing in comparison with other plants in the North. Already a considerable amount of tank and plate work is in hand. General plate work, such as on blast furnaces, bins, hoppers, etc., will be done at this shop and prospects are bright. The plant has five buildings, each served with a high-speed Shepard crane and two open runways served with Case cranes. Electric welding equipment has been installed and welded tanks on a large scale will be produced. The plant will specialize in filling station tanks from 500 gal. up and in horizontal cylindrical station storage tanks up to 21,000 gal. The concern will do a field storage tank work business involving the fabrication of the material in the plant and the erection of it in the field. R. I. Ingalls, president, is president of the R. I. Ingalls Iron Works Co., the largest steel fabricating plant in the district.

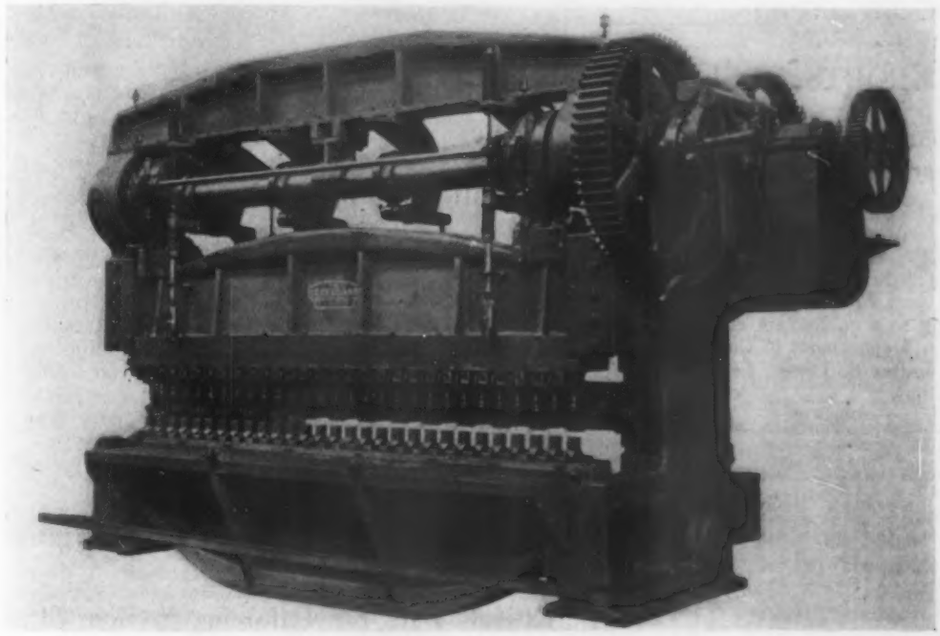
Standard sample, No. 63, phosphor bronze bearing metal, is now being issued with a provisional certificate by the Bureau of Standards.

Combination Multiple Punch, Gate Shear and Gap Forming Press

The combination multiple punch, gate shear, and gap forming press shown in the accompanying illustration is a recent development of the Cleveland Punch & Shear Works Co., Cleveland. The machine measures 12 ft. 2 in. between housings, has a 15 in. horizontal gap, and weighs 40 tons.

The illustration shows the machine arranged as a multiple punch. Automatic stripper, positive jaw clutch for regular run of punching, adjustment to slide, friction clutch for forming, patented single-bolt gagged adjustable punching attachments, interchangeable plate shearing attachment, and safety counterweights for balancing the sliding head are features. The clear working space behind the machine is emphasized.

All gears are of steel and have cut teeth. The automatic stripper is designed with adjustable trunnions, so that the flat finished face of the stripper fingers will always strike minimum and maximum thickness of material squarely, and not in a "cocked" position. This arrangement is claimed to reduce greatly the breaking of punches due to cramped stripping.



Combination Multiple Punch, Gate Shear and Gap Forming Press. As shown at the left the machine is arranged as a multiple punch. The automatic stripper, and the single bolt gagged adjustable punching attachments are among the features

The patented single bolt-attachment is intended to reduce the setting-up time for multiple punching. In setting up the usual "T"-shaped attachments having a bolt front and rear, it is difficult to get at the rear bolt without first removing the stripping attachment. This operation requires a man at front, and one at the rear, and frequently the use of a crane. With the new single bolt attachment, it is claimed that one man can do the setting up without difficulty.

The cast steel adjustable cup strippers are accessible, and may readily be adjusted or removed from the front of the machine.

Zinc Output in 1923

The production of primary zinc in the United States in 1923, according to data prepared by C. E. Siebenthal and A. Stoll, U. S. Geological Survey, was 510,434 net tons, of which 508,335 tons was produced from domestic ore. This is the largest production in the last four years, the next largest having been 463,377 tons in 1920. The amount of redistilled secondary zinc produced in 1923 was 39,900 tons, also the largest in the last four years. This brings the total zinc production of the country in 1923, both primary and secondary, to 550,334 tons, of which 311,157 tons was grade D and 90,087 tons was grade A zinc.

The apparent consumption of zinc in the United States last year is also given as 446,585 tons, which compares with 373,090 in 1922 and with 323,043 tons in 1920. The report also states, as to retort capacity, that the total number of retorts at active plants in 1923 was 140,352, or the largest in the last four years, with the exception of 1920 when the total was 158,545. The number of retorts in operation at the end of 1923 was 86,700, compared with 81,000 at the end of 1922 and 56,000 at the end of 1920.

Wholesale Prices Show a Decrease

March figures for "all commodities" reported by the Bureau of Labor Statistics show a price level of 150 compared with 100 as the average of 1913. This is a decrease from 152 for February and with the exception of August, 1923, and June, 1922, which were at the same figure, is the lowest for any month since May, 1922. During the intervening period the figure has ranged between 150 and 159, the latter prevailing in March and April last year. The decrease in one year, therefore, has been nine points or 5.7 per cent.

Metals and metal products stand at 144 in March, compared with 143 in February. This group has been continuously lower than the "all commodities" price for more than six years. In February only chemicals and drugs and the miscellaneous items were below the level of metals. In March foods and farm products have passed below metals. Details of the different groups are shown in the table, which indicates the position in February and March, 1924, in March, 1923, and the percentage decrease during the intervening year:

	1923	1924		Decrease in
	March	Feb.	March	One Year
Farm products	143	143	137	4.2 per cent
Foods	143	143	141	1.4 per cent
Cloths and clothing	201	196	191	5.0 per cent
Fuel and lighting	206	180	181	7.3 per cent
Metals and metal products	149	143	144	3.3 per cent
Building materials	198	182	182	8.1 per cent
Chemicals and drugs	135	131	130	3.7 per cent
Housefurnishing goods	185	176	175	5.4 per cent
Miscellaneous	127	113	113	11.0 per cent
All commodities	159	152	150	5.7 per cent

Good Record for Republic Stack

The Republic Iron & Steel Co. has blown out No. 5 blast furnace in its Haselton group at Youngstown, for repairs and general overhauling. This stack has been active since Aug. 29, 1917, except for about 100 days, during which it was banked on account of labor troubles or other unusual conditions preventing operations. In that period, comprising six years and seven months, it produced 1,000,000 tons of hot metal. The stack operated longer on a single lining than any other furnace in the Republic company's group, at any time.

CANADIAN MARKETS DULL

Orders for Rails and Rolling Stock Have Improved Conditions Slightly

TORONTO, ONT., April 21.—Practically all interest has disappeared from the Canadian pig iron market during the past week or two. Orders against contracts and a limited spot demand ranging from 50 to 100 tons to an order furnish the only life in an otherwise stagnant market. Local blast furnace representatives say that a small number of the larger melters took the opportunity to place contracts for second quarter iron, leaving the majority to buy only in sufficient quantities to take care of needs a week or two in the future. Some interests were of the opinion that this would stimulate the spot sales, but so far business has been very quiet and the outlook for the future is far from promising.

The announcement by the acting Finance Minister regarding tariff reductions on practically all lines of farm implements is causing considerable concern to manufacturers of these products in Canada, it having been intimated in several districts that plants will be closed down, as it will be impossible to compete against foreign producers of implements.

The placing of orders for steel rails and rolling stock has resulted in a stronger demand and greater consumption of basic iron and steel mills at Sydney, N. S., Hamilton, Ont., and Sault Ste. Marie, Ont., are said to be operating around 70 per cent capacity. Foundries, on the other hand, are complaining of a general slackness in the demand for their products, which has resulted in a steady decline in the daily melt, with a consequent falling off in sales of foundry and malleable iron. While the production of basic iron is steadily increasing foundry and malleable iron output is at a minimum. At the present time there are seven furnaces blowing in Canada, as follows: Three at Sydney, N. S., two on basic and one on foundry; three at Sault Ste. Marie, Ont., two on basic and one on foundry; one at Hamilton, Ont., on basic. The Steel Co. of Canada, Hamilton, about four weeks ago blew out its furnace which was making foundry and malleable iron.

Pig iron prices are holding as follows: No. 1 (2.25 to 2.75 silicon), $29.15; malleable, $29.15; No. 2 (1.75 to 2.25 silicon), $28.15, Toronto. Montreal prices are: No. 1 and malleable, $31.55; No. 2, $30.55.

BRITISH EXPORTS DECLINE

Despite Longer Month, March Fell 13 Per Cent Below February—Imports Lower, Also

WASHINGTON, April 21.—Exports of iron and steel products from Great Britain in March of this year totaled 288,152 gross tons, against 330,523 tons in February, while imports into Great Britain in March amounted to 165,152 tons, compared with 190,434 tons in February, according to a cablegram received by the Iron and Steel Division, Department of Commerce, from Commercial Attaché Walter S. Tower, London.

Detailed figures follow:

	Imports		Exports	
Items	February Gross Tons	March Gross Tons	February Gross Tons	March Gross Tons
Pig iron and ferroalloys	32,195	23,870	40,992	36,413
Ingots, blooms, billets and slabs	93,050	71,928	950	1,357
Iron bars, rods, angles	16,257	15,219	3,815	3,592
Steel bars, rods, angles	13,188	13,648	25,641	17,850
Structural steel	5,795	4,701	6,193	5,136
Rails	1,313	771	26,025	15,960
Other railroad material	3,195	590	21,765	14,388
Hoops and strips	1,508	3,260	5,394	5,187
Plates and sheets	6,945	12,814	42,266	36,377
Galvanized sheets	....	....	50,175	50,310
Tin plate	....	....	44,962	46,137
Cast tubes, pipes and fittings	2,351	2,024	6,431	6,417
Wrought tubes, pipes and fittings	2,580	3,522	13,969	13,806
Wire	3,804	4,713	5,805	5,336
Wire cables and rope	....	....	1,831	2,310
Wire nails, including staples	4,314	4,140	313	265
Wire manufactures, not elsewhere specified	406	688	1,672	1,351
Nails, tacks, rivets and washers	280	255	1,334	1,396
Bolts and nuts, including screws for metals	417	470	2,337	1,860
Iron and steel castings	841	768	109	233
Iron and steel forgings	168	140	98	40
Totals	190,434	165,152	330,523	288,152

Prospect for Selling American Products to Indian Railroads

WASHINGTON, April 22.—Declaring that purchases for the India railroads amount to approximately $16,000,000 a year and that formerly nearly all of this sum was spent in Great Britain, E. G. Gregg, Chief of the Transportation Division, Department of Commerce, last week expressed the view that American railroad equipment companies have a better chance to sell their products in India than before the war. He pointed out that changes in the political situation in India have resulted in a liberalization of the strict rules of purchase for the State railroads. One American locomotive company, he pointed out, now has an order for four locomotives for an Indian railroad and has a special type on trial for another. Mr. Gregg said that while India is two-thirds the size of the United States, it has less than 40,000 miles of railroads and that the needs of the country demand an expansion of transportation facilities.

British Finished Steel in 1923

WASHINGTON, April 22.—The production of finished steel in Great Britain in 1923 was 6,063,700 gross tons, according to provisional figures compiled by the National Federation of Iron and Steel Manufacturers of Great Britain and communicated to the Department of Commerce by Trade-Commissioner H. B. Allin-Smith, London. Last year's production represents a 30 per cent increase over 1922, when the total was 4,645,100 tons, but it is a decrease of 11 per cent under that of 1920, when the output was 6,831,000 tons.

Of the 1923 total 1,675,000 tons was principally structural steel, with the galvanized sheet total 689,300 tons, the tin terne and black plate total 727,400 tons and the steel plate total 922,500 tons. Forgings accounted for 262,900 tons.

Extends Date for Enforcing Section 28 of Jones Merchant Marine Act

WASHINGTON, April 22.—The Interstate Commerce Commission has extended from May 20 to June 20 the effective date of Section 28 of the Jones merchant marine act, which provides for preferential railroad rates on exports and imports when carried in American bottoms.

Will Confer on Tank Simplification

WASHINGTON, April 22.—Because elevated steel tanks on towers have been constructed in the past largely according to individual sets of specifications manufacturers of tanks have asked the Division of Simplified Practice, Department of Commerce, to arrange a conference looking to the adoption of sizes and designs which will simplify this procedure. The meeting will be held at the Department of Commerce on April 29.

The conference is expected to result in a complete survey of the needs and practice in present construction and to bring forth at a later date recommendations for a simplification program.

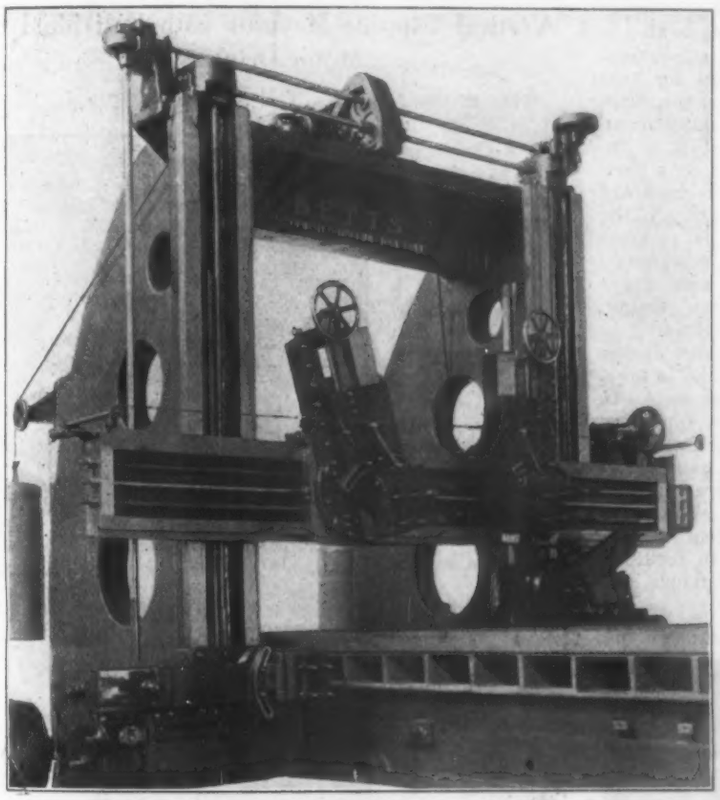
Because of the heavy loss suffered by the Lockhart Iron & Steel Co., Pittsburgh, recently, when its Sligo mill, Connellsville, Pa., burned, the city council has exempted the concern from its 1924 city taxes. The company did not ask the exemption, which was urged by citizens.

LARGE PLANER FOR SEVERE DUTY

Heads and Table of Special Design—Electric Feed and Power Rapid Traverse—Other Features

Extra-heavy construction, to meet the requirements of unusually severe service in the manufacture of large electrical equipment, is an outstanding feature of the planer illustrated, which was built recently by the Consolidated Machine Tool Corporation, Rochester, N. Y.

The machine has a capacity of 120 in. x 120 in. x 30 ft. planing length. The planing of radial slots in large rotors to a depth of 12 in. with 2 in. wide form tools, planing two slots simultaneously, is among the uses to which the machine will be put. The weight of these rotor castings is approximately 300,000 lb., which is supported on trunnions spaced about 22 ft. apart. Although all of the improved features of previous Betts planers are incorporated, the machine illustrated is different in the design of the heads and table.



Planer Designed for Heavy-Duty Service in the Manufacture of Large Electrical Equipment. The machine has a capacity of 120 x 120 in. x 30 ft. planing length. Extra-heavy construction, heads and table of special design are features

The main drive is by means of a large reversing planer motor. The rack and rack gear are of wide face and coarse pitch and the driving gears, which are of steel, are cut with special single purpose tools. Smoothness of the table drive is a feature. The bed is of heavy pattern, and is entirely closed across the top except where the rack gear meshes with the rack. The distance between the table tracks is of unusual width, with wide tracks.

The table is of double plate casting type and is designed so that chips may be raked out without interference. To take care of cutting compound special grooves are planed in the table, the left-hand side of which is 1 in. lower in the opening than the right-hand side, so that the compound will flow by gravity into a trough along the side of the bed. Special guides are cast on the bottom of the table to prevent shifting of the table when making heavy side head cuts.

The uprights are of wide face with extra long bearing on the bed, to which they are fastened by tongue and groove, key and several heavy bolts. The crossrail, which also has a wide face, is carried back between the uprights in order to provide the necessary stiffness when both heads are planing near the center of the machine. The crossrail is clamped to the uprights at both inside and outside flanges.

The crossrail heads are of special off-set pattern for planing with the heads close together. To withstand the heavy strain when the tools are extended down into the solid metal for a distance of 12 in. the heads have been designed with metal to metal contact from the tool back to the crossrail. The tool heads are equipped with an improved tool-lifting device of simple design, and tool aprons are provided with Tee slots to give wide range for tool setting.

The side heads are of Betts extension slide type, provided with a knee for rigidly supporting the tools when the side heads are extended out a considerable distance from the uprights. The knee support bears up against a finished vertical pad on the inside of each upright, and is arranged so that the side head will carry the knee support for the full vertical travel. The knee support is removable when not in use. The side heads are counterweighted.

All four heads have electric feed and power rapid traverse which is driven by the motor on top of the machine used also for raising and lowering the crossrail. The electric feed and power rapid traverse is controlled by a small drum switch and push button stations which are conveniently placed. It is said that with this arrangement only about 4 in. of table travel is required for feeding the heads, the table travel being constant irrespective of whether minimum or maximum feed is being used.

The table tracks, driving gears and bearings have forced lubrication from a large double motor-driven pump accessibly located on the outside of the machine. One pump drives the oil through the planer and the other brings it back and forces it through a special oil filter system, the filtered oil being used again. The table tracks are provided with oil pockets and rollers in addition to the forced lubrication.

The driving gears are mounted on dead shafts and have large phosphor bronze bearings. It is emphasized that with this construction no tight fit need be destroyed in order to remove any of the driving gears.

The Republic Iron & Steel Co., Youngstown, has placed the employees in its safety department on an 8-hr. basis, 125 being affected. They had previously worked under a two-shift arrangement. Elimination of the 12-hr. day for safety department workers was inaugurated April 1 in the Youngstown district by the Carnegie Steel Co. and closely followed by the Youngstown Sheet & Tube Co.

Excavation work for the foundations of the new eight-mill sheet plant being erected by the Youngstown Sheet & Tube Co. at its Brier Hill works is well under way and cement will be poured shortly. It is expected erection of the steel work, involving 2200 tons of structural steel, will begin next month. The plant, with equipment, is expected to be ready for operation next fall.

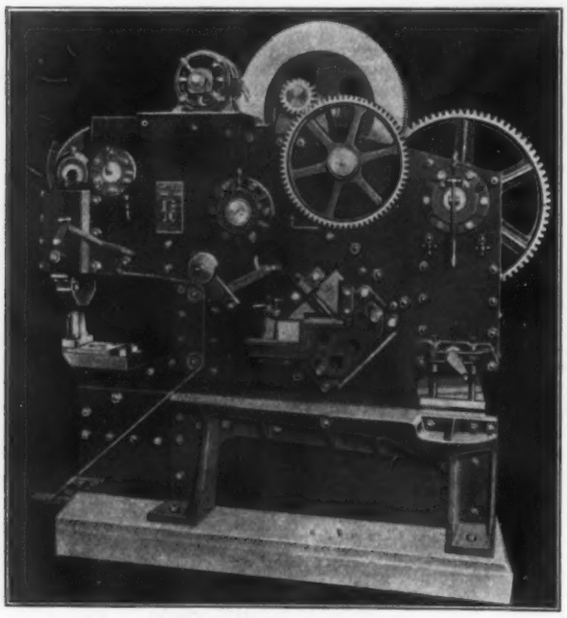
Sales of mechanical stokers in March are reported by the Department of Commerce at 89 in number and 34,597 hp. This is much less than in January or February and is much less than in any month in 1923, except the last three months. The figure in February was 62,113 hp., while the average for 1923 was 60,870 hp.

New Series of Combined Slitting Shear, Punch and Bar Cutters

A new series of combined slitting shear, punch and bar cutter with diagonal bar cutter slide, representing increased capacities and reduced size over the company's previous universal machines which they displace, has been brought out by the Buffalo Forge Co., Buffalo. The two smaller sizes of the series, designated as the No. 1 and No. 2 universal iron worker, are the same as the larger machines except there is but one plunger for both the bar cutter and slitting shear, the five larger machines having a separate plunger for each of these operations.

An improved mitering arrangement, new type main gears, a heavier side bracket, and a shift in position of the shear clutch, are among the changes incorporated in the new design. With the previous mitering attachment it was necessary to move the stripper screw for each different angle desired, but in the new design the stripper screw is universal and requires no adjustment. With the diagonal bar cutter arrangement it is intended that angles may be mitred or beveled on a horizontal plane. This feature is emphasized as important because it obviates lifting and twisting to obtain the proper inclination for the cut. The three large cast-iron main gears previously used have been replaced in the larger machines of the new series by steel gears and nickel steel pinions. The new gears are smaller, thereby saving in weight and space requirements.

The side bracket for supporting the plates during the slitting operation has been improved, the bracket and the two supporting legs being cast in one piece. In the previous machines this bracket was not supported by legs and was merely bolted to the machine. An improvement intended to add to the ease in handling is the placing of the shear clutch on the operating side, instead of on the gear side as formerly. The semi-floating punch is engaged by handle or foot treadle. Dieblocks are provided with each machine to facilitate the punching of standard sizes of beams, channels, girders and "H' columns in the web and flanges of any



Mitering Arrangement, Main Gears, and Shift in Position of Shear Clutch are Improvements in New Series

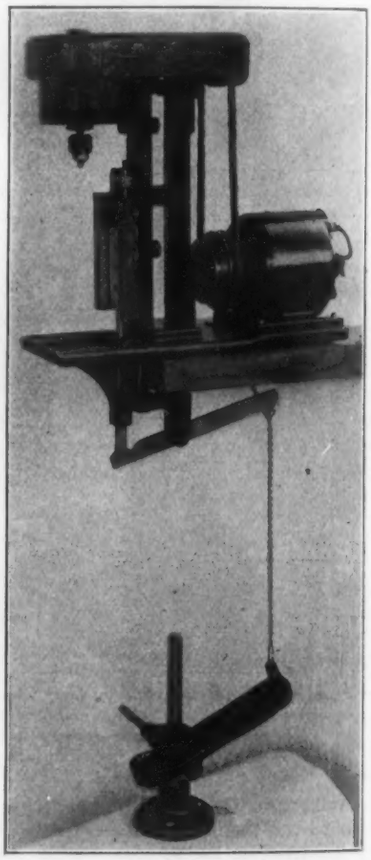
standard size made. Holes may be punched in any part of the web without turning the section over. Flanges may be punched by removing two bolts at the base of the dieblock, lifting off the high die holder, and replacing the short punch holder with a long one. The punch is then ready for any standard beam, channel, girder or "H" section. Either block and punch is suitable for punching flats. The punch is provided with a gag, making it semi-floating. The bar cutter is engaged by shifting the ram by means of a counter-weighted lever. Stops for shearing angles, squares or 45 deg. mitre are fixed, making it unnecessary to mark the angles.

All slides are of cast steel, and all gears are machine cut. Bearings are bronze lined. The frame construction is of armor plate which is claimed to have seven and one-half times the tensile strength of cast iron.

The punching capacity of the new series ranges from 1 x ½ in. for the smallest machine to 1¾ x 1½ in. for the largest; slitting plate capacity ranges from ½ to 1½ in. Other capacities, such as that for squares, rounds, angles, etc., have a corresponding range.

Vertical Tapping Machine with Individual Motor Drive

The Bicknell-Thomas Co., Greenfield, Mass., has added to its line the high-speed vertical tapping machine illustrated, which is equipped with individual motor drive and has a tapping capacity of ¼ in. in cast iron or brass and of 3/16 in. in steel. Two tapping speeds, 600 and 1000 r.p.m. are provided, and for small brass work, speeds of 1400 and 2000 r.p.m. can be furnished.



The machine is driven by a 1/6 hp. motor, mounted as shown and taking current from a lighting socket. Either direct- or alternating-current motors of any voltage required may be provided. A hardened alloy-steel cone clutch on the chuck spindle is incorporated in the drive, which is claimed to be so sensitive that the breaking of even the smallest taps is prevented. When the tap has entered to the required depth, the spindle reverses automatically at twice the entering speed.

The vertical table is hardened and surface ground, and slides on steel balls. It is provided with a T-slot and six tapped holes for locating and fastening jigs or special work-holding fixtures. The table being similar to that on the company's No. 1 horizontal tapping machine, the same fixtures may be used on both machines.

The table is operated by the lever and foot treadle shown, an arrangement which leaves the hands of the operator free to handle the work. The foot treadle is adjustable for length, and two sizes of the treadle are available, the smaller size being intended to fit the shoe of girl operators. All moving parts, including the belt, are provided with safe guards which is important, as machines of this type are usually operated by girls.

The driving head is packed with grease, which lubricates all parts. The bench space occupied by the machine is 8 x 14 in., and the height above the bench is 17 in. The weight of the machine, which is designated as the No. 11-M, is 70 lb.

GERMAN IRON MARKET BRISK

Ford Tractors and Cars Being Introduced—Greater Coal Production—Scrap Prices Again a Factor

BERLIN, GERMANY, April 5.—Demand for iron products in the Ruhr district, which has been quiet for the last few months, is increasingly strong at present and generally manufacturers ask about three months for delivery. Business on the Ruhr has increased in volume, especially during the last three weeks. Orders are mainly from traders replenishing their stocks in expectation of improving demand from consumers. Engineering firms are already complaining that the rolling mills are increasing the time of delivery and refuse orders for specialties. There is also a scarcity of some grades of refined steel required in the manufacture of tools.

With the improvement in trade, prices are going up. The works quote bar iron, for instance, at 150 to 155 marks per ton (1.62 to 1.67c. per lb.), and about 200 marks (2.16c.) for thin sheets, and they show a strong upward tendency, especially as scrap prices are advancing. For best scrap 96 marks per ton ($23.22) already is asked and it is said that the establishment of the scrap exchanges in the Rhenish-Westphalian district at Düsseldorf, Essen and Dortmund have had the tendency to enhance prices. As the Ruhr district uses 70 to 80 per cent of the total German scrap consumption, these exchanges may eventually become of great importance to the industry.

Scrap Situation Critical

Scrap prices are considered too high in relation to rolled material and the works are not buying at all or procure only small lots, so that there is only a small turnover in spite of a fair demand. Consumers are reckoning with an agreement for the supply of Lorraine minette in relation with the contracts with the Mission Interalliée. In this case the demand for scrap would be considerably smaller, which also would influence prices. Negotiations have been started in Berlin between representatives of the scrap trade and the authorities to insure a greater percentage of scrap from dismantled ships for the home market. Up to now only 25 per cent were retained for inland use, while the rest had to be exported. The traders are also urging the Government to reinvite tenders for the scrap available at the railroads, but the managers declare this to be impossible at present, as they are obliged to return the scrap if they are giving orders for new material.

Prices Generally Advanced

The West German Iron Traders' Association at Düsseldorf has increased prices and is quoting as follows for both the occupied and unoccupied area: Bar iron, 200 marks per ton (2.16c. per lb.); structural shapes, 195 marks (2.11c.); universal iron, 210 marks (2.27c.); hoop iron, 250 marks (2.70c.); heavy sheets, from 210 to 230 marks (2.27 to 2.49c.); medium sheets, 240 marks (2.59c.), and fine plates, from 250 to 480 marks (2.70c. to 5.19c.), according to thickness. The Tube Manufacturers' Association has advanced prices by 5 to 10 per cent, according to size and quality, and the Association of Manufacturers of Fittings is raising prices by 10 per cent, owing to the advance in prices of raw material. The Pig Iron Association is also raising prices for foundry iron, Luxemburg quality to 90 marks ($21.78) at Wintersdorf for the unoccupied part of Germany, and to 89 marks ($21.54) at Sierk for the occupied area. For the northern parts of Germany special prices are made on account of the strong British competition there.

Conditions in the Siegerland iron industry are improving. The works are gradually increasing their production and the iron ore mines, which have to a great extent been idle for some time, are restarting and those that have been able to produce on only a reduced scale are enlarging their output. Large orders for the specialties of the Siegerland district, thin iron plates, etc., have been booked and demand continues brisk. It is also confidently expected that special freight rates will be introduced for the Siegerland industry so that the supply of fuel would be more favorable and the iron mines would be able to work on a more profitable basis. The mines have reduced the price of rost spar by about 1 gold mark (24c.) per ton.

Exports and Locomotives

Rolled iron export business is also livelier lately and the competition of the Lorraine and Saar works abroad is weakening. In the south of Germany, where their competition was especially strong some time ago, they are hardly in the market now. It seems that they are booked up for a long time to come. The building industry has not yet given orders to any large extent and the railroads are still carrying on their policy of keeping down expenses and are placing few orders for material as well as for rolling stock. Owing to the lack of foreign orders the locomotive factories are in want of employment and are especially concerned about the precarious position of the railroads, which makes it impossible to give larger orders for new engines, etc. Some locomotive firms are therefore turning to other lines of manufacture.

Employment in the engineering industry generally has altered little during the last few weeks. Demand for workmen, except for highly skilled, has not increased. The extension of working hours to the pre-war standard has, on principle, been introduced nearly all around, though employment in some lines is not yet strong enough to warrant the increase. On account of the liveliness in the textile industry manufacturers of textile machinery are well employed. More orders for medium machine tools have been booked lately. The scarcity of liquid capital and of credit on reasonable terms is greatly hampering business. Few firms are in a position to lay in a stock and many export orders are lost, as manufacturers are unable to supply on credit.

Ford Cars in Germany

The competition of foreign manufacturers in the German market and the expected introduction of Ford motors will force German automobile manufacturers to improve their methods and organization, and negotiations have been started between the two largest southwest German automobile works, the Benz Motor Co., Mannheim, and the Daimler Motor Co., Stuttgart-Untertürkheim, with a view to effect a merger. It is stated on good authority that the negotiations are progressing, so that a fusion of some sort may be reckoned with.

The Ford Motor Co. has made an agreement with the Berlin-Burger Eisenwerke for the assembling and sale of Ford automobiles in this country, the assembling is taking place at a factory of the Berlin-Burger Eisenwerke on the seaside and large consignments of spare parts have already arrived at German ports. Chassis and other bulky parts are to be manufactured on Ford methods in this country. The Berlin-Burger Eisenwerke is connected with two large firms in the automobile trade—the Steyr Automobilvertrieb and the trading firm of K. A. Klein in Berlin. They have separated their connection with the G. Roth Co., Vienna, and are devoting themselves especially to the Ford motor business now.

At present the import of 500 Ford motor tractors has been granted on the application of the Ministry of Agriculture to enable the farmers to get cheaper engines than the home industry is in a position to supply. The permission has been given on the condition that only 250 tractors are imported ready for use, while the rest are to be assembled in this country. The terms of payment are still under negotiation, but it is understood that several months' credit is given.

In regard to the general removal of import restrictions on motor cars, no definite decision has been arrived at yet, but the authorities hold the view that this will have to be done in a short time, which will give the German automobile industry a chance to adapt itself to the changed conditions and make improvements in manufacturing methods which will enable it to compete with foreign makes. Up to now import permission for automobiles has been given in only a few cases. The German motor car industry is at

present not in a position to work according to American methods, but improvements in this direction are being made and the general meeting of the Federal Association of the Automobile Industry passed a resolution against a too hasty abolition of the import restrictions, as the German industry has not had sufficient time for the reorganization of its works to meet the foreign competition.

Bankruptcies and Living Costs

Since the stabilization of the currency there has been a remarkable increase in the number of bankruptcies. There were seven cases of insolvency in November and 18 in December last year; 28 in January, 42 in February and 62 in March this year. According to the financial paper, *Die Bank*, 132 cases of bankruptcy have occurred during the first quarter of this year compared with 37 during the last three months of 1913. During the last few weeks the fluctuations in the wholesale trade and the cost of living indices have been small. The average wholesale number for March has, however, increased by 3.9 per cent. Prices for foodstuffs advanced by 5.6 per cent to 106.4 (1913 = 100), industrial products by 1.7 per cent to 147.4, inland goods by 3.9 per cent to 108.2, and imported goods by 3.7 per cent to 182.8.

According to the official statistics, German coal production has further increased, a development which is mainly due to a greater output in the occupied area. In the Dortmund district, for instance, the output totaled 7,268,312 tons during February compared with 6,204,101 tons during January this year, and for the whole of Prussia 9,320,000 and 8,350,000 tons respectively. Lignite production has been smaller.

Production in Metric Tons

	February, 1924	January, 1924	February, 1923
Coal	9,726,081	8,787,393	8,156,825
Lignite	8,327,469	9,553,316	11,538,032
Coke	1,742,405	1,473,929	2,020,962
Coal briquettes	263,328	171,077	289,596
Lignite briquettes	1,817,511	2,005,453	2,480,802

ABSORBING LOWER EXCHANGE

French Iron and Steel Prices Being Reduced Gradually—Foundries Are Booked Well Ahead

PARIS, FRANCE, April 11.—Although the market is characterized by the return of the producers, the tone is generally easier; prices are declining progressively, thus preventing the collapse that was so much feared. Delivery times do not now exceed five to six weeks, or two months in the busiest departments. On the other hand, the instability of sterling and the uncertain renewal of the Ruhr agreements are two factors against the revival of trade. Prices are not yet what they should be as compared to the rate of sterling, now at 70 to 75 fr.

Numerous orders are still canceled for export, especially from Great Britain, on the pretext of delays in deliveries; these delays, in reality, are consequent on a shortage of railroad cars for shipment. Due to these incidents, material is more plentiful. The Brussels Bourse continues dull, the rise of the franc having a disturbing influence on trade; prices are nominal, as no dealings are recorded.

Coke.—During the first seven days of April arrivals of coke from the Ruhr were 122,481 tons, or 17,500 tons daily average. Owing to the revaluation of the franc, the price for indemnity coke will be tried at 145.25 fr. ($8.84) on trucks at Sierck for the first two weeks of the month. In addition to this, 0.50 fr. per ton will be charged for the Orca's expenses, and 5 fr. per ton for the constitution of mutual assurance funds, in view of the distribution of bounties to the plants receiving no indemnity supplies. Thus the price of indemnity coke will work out at 150.75 fr. ($9.17) altogether, or much the average of British coke delivered here.

At last there is talk of reaching an agreement for the definitive constitution of the Orca. It is reported that the Center and Southern plants, owing to their long distance from the frontier, will remain out of the organization with Hagondange, thus leaving about 30 plants of the East, North and Lorraine regions to form the society. The apportionment of coking smalls to the plants will be made by the Orca. The question of export premiums is unsolved.

Pig Iron.—If there is an increase in the production, it is but moderate, due to the reserves of coke constituted by the ironmasters. Disposable coke is more plentiful, but not in such proportion as to have any effect on prices. The April average is maintained at 415 to 420 fr. ($25.25 to $25.55) and is expected to be 410 to 415 fr. ($24.94 to $25.25) at end of the month, and 400 to 405 fr. ($24.33 to $24.64) in May. A shortage of cars on the East Railroad is preventing part of the shipments.

In hematite, disposable material still is scarce, thus allowing a certain firmness at 500 fr. ($30.42) per ton at furnace, or delivered, according to the position of sellers and the degree of British competition. Prices, however, tend to 475 fr. ($28.90), which corresponds to the value of East Coast mixed numbers here. Swedish malleable iron is sold at Rouen, delivered, at 645 fr. ($39.24) for the white grade and 690 fr. ($41.98) for the gray. Twenty tons of forge hematite have been sold at 480 fr. ($29.20), Savoy mills.

Ferroalloys.—Alloys, as sold by the Comptoirs at beginning of April, show no alteration. The ferrosilicon 10 to 12 per cent has been quoted during the last few days at 600 fr. ($36.50) in the Savoy, or 650 fr. ($39.55) delivered, showing a decline of 50 fr. on the previous week. Ferromanganese is downward at 1575 to 1600 fr. ($95.82 to $97.35) for the 76 to 80 per cent Mn, according to destination and for 10 tons minimum, or equal to the British grades.

Semi-Finished Products.—Not very abundant, as the plants have them for their own use, but materials are obtainable. Ingots are quoted at 500 to 510 fr. ($30.42 to $31.03); blooms, 530 to 540 fr. ($32.24 to $32.85); billets, 570 to 580 fr. ($34.68 to $35.30).

Rolled Steels.—The plants have still a fair volume of orders on hand, this preventing an accentuation in the fall of prices, due to the reserve of buyers. Almost all the producers are now accepting orders in beams; in the East the average is 60 to 64 fr. per 100 kilos (1.63 to 1.74c. per lb.) at mills, with a tendency to ease a little. Deliveries are five to eight weeks.

In merchant grades the orders for large samples are more easily accepted at prices varying from 63 to 66 fr. (1.71 to 1.79c.) with a delay of 6 to 10 weeks. More difficulty is encountered in the placing of orders for small and medium samples. Iron is maintained at 70 fr. (1.90c.) North and Ardennes, where the mills are fairly busy. Hoops can be had now at 80 to 85 fr. (2.17 to 2.31c.) basis. For export, business is very quiet and tenders vary between £6 15s. and £7 maximum, or 500 fr. (1.36c. per lb.) per ton, about, or more than 100 fr. from inland prices.

Sheets.—Unstable and irregular prices, according to the activity of the plants. The heavy gage is easier at 75 fr. (2.04c. per lb.) minimum for the 5 mm. (No. 6½ gage) and above. In the East large flats are worth 74 to 76 fr. (2.01 to 2.06c.); 5 mm., 76 to 78 fr. (2.06 to 2.12c.); other grades are much better sustained in price at 100 to 103 fr. (2.72 to 2.80c.) for the 3.5 mm. (No. 10 gage) in the East, and 115 to 120 fr. (3.12 to 3.26c.) basis at mills, for the light gage. The delays for heavy grades are four to six weeks.

Wire Products.—Less scarcity in wire rods. Most of the plants take orders at 78 to 80 fr. ($47.45 to $48.67 per gross ton) per 100 kilos at mills; delivery April and May. Wire goods also are downward.

Foundry.—The plants are booked for two or three months ahead, even in pattern foundry. This had led to firmness of prices, with now an increase of 15 fr. per 100 kilos for ordinary iron castings and 25 fr. for malleable castings.

Mechanical Construction.—The plants are busy for six or eight weeks. An important order for locomotives and tenders for the French colonies has been adjudicated at 5.60 fr. per kilo (15.2c. per lb.).

Little Opposition to Immigration Bill

Neither Manufacturers Nor Labor Leaders Take Active Part in Regard to Legislation—Provisions of Measures Now in Conference

BY L. W. MOFFETT

WASHINGTON, April 22.—The iron and steel industry and employing interests of the country generally have accepted restrictive immigration legislation with comparatively little complaint. Leaders in Congress say that this passive attitude is due principally to two factors. One is the sympathetic spirit that is said to have spread over the country toward further cutting down of immigration, and an improved process of selection as a sensible means of developing the Americanization movement. From the more important point, the issue is handled as a social question. The second element is that industry evidently had anticipated, and therefore had discounted, the legislation and was convinced that further protests would be futile.

One prominent member of the Senate, familiar with the iron and steel and related industries, declared that employers constantly are giving more thought to increasing the efficiency of the man-power and mechanical operations and through various wage plans, such as the bonus, and piece work, have built up greater production per man.

Present and Contemplated Immigration Quotas

	Present Law	2 Per Cent, 1890 Census In Conference (100 Minimum)	National Origins Method—1920 Census
Austria	7,342	990	1,842
Belgium	1,563	509	255
Bulgaria	302	100	33
Czechoslovakia	14,357	1,873	1,319
Denmark	5,619	2,782	1,042
Esthonia	1,348	102	221
Finland	3,921	145	995
France	5,729	3,878	5,526
Germany	67,607	50,129	22,017
Great Britain and Ireland	77,342	62,458	91,110
Greece	3,063	100	536
Hungary	5,747	488	1,259
Italy	42,057	3,889	5,877
Netherlands	3,602	1,637	2,669
Norway	12,205	6,453	2,433
Poland	30,979	8,872	4,509
Rumania	7,419	631	386
Russia	24,405	1,792	4,002
Sweden	20,042	9,561	3,706
Switzerland	3,752	2,081	781
Yugoslavia	6,426	735	602

It is contended that under the present 3 per cent quota law, the iron and steel industry had previously been compelled to turn to improved methods of production and to new sources of labor and that therefore it had already been prepared to a considerable extent at least for a still greater cut in the immigration quota.

Immigrants for Iron Industry

Whether well founded or not, a general estimate prevailed in the iron and steel industry that it gets only one out of 10 male immigrants and that the difference in this restriction and the one provided in the legislation just passed by Congress is of no great importance. It is also evident that American industry has been looking with considerable suspicion on immigration since the war for fear of the radical character of a portion of it.

There can be no doubt that the relative inactivity of industry as to immigration measures expedited their passage. While it may also have been helped by the support of the American Federation of Labor, it is only fair to say that organized labor itself did not, outwardly at least, exert any pressure in favor of the legislation, although unquestionably it is gratified over it. It is indicated from this that organized labor took as a matter of course that Congress would cut down the immigration quota. As a matter of fact, this feature of the legislation received much less prominence than the amendment which excludes Japanese immigration. The State Department is opposed to this exclusion and it is objectionable to Japan. There is a question as to whether President Coolidge will veto the new immigration bill because of this feature. Even if he should do so, his veto would be easily overridden because of the overwhelming votes both in the House and the Senate on the immigration bills. The two measures are largely similar and indications are that there will be no difficulties in the House and Senate conferees reaching an early agreement. Both bills provide immigration quotas at 2 per cent on the basis of the 1890 census figures, as compared with 3 per cent of the 1910 census figures in the existing law which expires on June 30.

Provisions of Different Bills

The present law permits an annual immigration movement of approximately 360,000, while the quota total of 150,000 is estimated under the Senate bill, and the House bill would admit about 162,000, with a like number, in the view of Senator Reed, Republican, of Pennsylvania, permitted to come to the United States by reason of exceptions included in the bill. The new legislation also would draw proportionately more heavily from the Nordic countries and at the same time greatly reduce the movement from southern Europe. The Asiatic exclusion and other provisions in both bills were almost identical.

The House bill provided exemptions for relatives of citizens and skilled laborers and families but this provision was not adopted by the Senate. Conversely, the Senate inserted a provision not carried in the House measure which practically limits the life of the bill to July 1, 1927, by which time there would be made a population survey by the Secretaries of State, Commerce and Labor, designed to provide a permanent method for computing quotas in the future. This provision is called the national origins method and provides for immigration of 150,000 annually. The Senate also adopted an amendment giving preference to farm labor immigrants upon certification by States that such labor is needed. Senate conferees will make a strong effort to have the House conferees accept both amendments. The Senate rejected the House provision calling for supervision of alien seamen arriving in American ports. The Senate bill provides a system of visé certificates, while the plan carried in the House measure calls for "stamped passports" with regard to examination abroad of those attempting to emigrate to the United States.

Senator Reed's Plan

The so-called "national origins" method of fixing the quota of immigrants at 150,000 annually was inserted in the Senate bill by Senator Reed of Pennsylvania and around it, if the House accepts it, as it is expected to do, will rest future immigration policy of the United States, beginning July 1, 1927. It gives Congress discretion to change the number of immigrants, however, and in this way is made flexible to meet farm or industrial requirements for labor, should they develop. The investigation to be made by the Secretaries of State, Commerce and Labor, to be submitted before March 4, 1926, is to show as nearly as may be the several national origins of the population in

the continental United States in 1920, excepting the descendants of such persons as were involuntary immigrants. In fixing 150,000 as the quota beginning July 1, 1927, it is provided that the annual quota of each nationality shall bear the same ratio to the maximum total number of immigrants as the number of inhabitants of the United States having that national origin shall bear to the whole number of inhabitants. On or before April 1, 1927, the Cabinet officers making the survey will be required to make known the quotas of each nationality, such quotas to continue thereafter, subject to correction and readjustment only if it appears to the satisfaction of the officials that an error has occurred in the estimate or proclamation.

The present 3 per cent law, the legislation about to be passed and the "national origins" quotas by the most important countries from which immigrants come to the United States are set forth in the accompanying table.

JAPANESE TRADE QUIET

May Buy Transmission Towers—Exclusion Not Believed Serious Trade Deterrent

NEW YORK, April 22.—Trade with Japan is quiet and but little increase in demand is expected until after May 15, when election for the new Diet will be held. In addition to an inquiry for a small tonnage of pipe, the Imperial Government Railways has been in the market for 350 tons of No. 8 gage plain galvanized wire and 400 tons of No. 8 gage telegraph wire, bids opened April 19. The 11,000 splice bars for the South Manchuria Railway Co. are understood to have been placed with Mitsui & Co., New York, but no action has been taken on the 1100 pieces of rails or the small tonnage of spring steel, tenders for which were issued several weeks ago. In view of the fact that most of the spring steel used by the Government railroads in Japan is furnished by Japanese makers, it is considered probable that this order may go to a native steel company. The Tokio Electric Light Co. is said to be contemplating purchase of 120 miles of fabricated transmission towers, which will involve about 4000 tons of steel.

The Chinese market is, as usual, marked by an inclination on the part of purchasers to offer lower than current prices for material. Firm offers to buy copper at slightly less than the current price have been made and low offers have been cabled on tonnages of second-hand plates, wire shorts and similar material. On tin plate, exporters have been able to offer on a basis of about 25c. per box less than the current Pittsburgh base, but with few sales. Aside from merchant purchasing in China, there is reported some activity among the railroads, which may result in fairly large purchases.

It is understood that final and satisfactory credit arrangements for the 4260 forged steel car wheels placed by a Belgian car builder with a large maker in the United States have been about completed and the order will be executed shortly. The wheels are reported to be for cars purchased by a South American railroad.

Importers in New York, who are in touch with German mills, report that German manufacturers, who have been practically out of competition in foreign markets for the past year, expect to become active in export provided the report of the reparations commission is accepted by Germany and the Allies as a basis of settlement. It will then be possible to begin figuring costs of raw materials accurately and German manufacturers feel that export on a fairly large scale will be absolutely essential to continued payment of reparations.

One large importer in New York has been offering pig iron, semi-phosphorus foundry grade, from a Dutch furnace interest and has recently booked several small trial orders for New England foundries, totaling about 1000 tons. It is pointed out that these are partly to introduce the iron to American users and as far as can be ascertained foreign iron from other sources is not at present competitive on the Atlantic seaboard. Sales are still made to Pacific Coast consumers.

An import company with Continental mill connections has recently sold 1000 tons of 60-lb. rails to a small American railroad. One seller of Continental and British material in New York is now offering British cotton ties at $1.44½ per bundle, c.i.f. Atlantic port. As the cotton tie market has not officially opened, it is difficult to estimate whether this price is too high or is low enough to result in business.

It seems to be the consensus of opinion among Japanese and American exporters that the recent vote on the Johnson bill, by which Japanese and Chinese are excluded from the United States, will have little or no direct effect on trade. The depressing effect on Japanese exchange, however, represents an uncontrollable factor. It is pointed out that Japan realizes that regardless of political developments, a balance of trade with the United States must be maintained in order that Japan may continue to sell here.

LOOKING Toward the Marunouchi District. The small wood-frame dwellings, covered with steel sheets, were erected in the devastated areas for temporary occupancy. The picture shows some of the larger, more modern structures which withstood the shock of the earthquake

At Right, Site of the New Mitsui Bank. The square block adjoining the large white building, the Mitsukoshi, a prominent department store, is occupied by the buildings of Mitsui & Co. It is on the site marked in the airplane view that the new Mitsui Bank and Trust company is to be erected by James Stewart & Co. of New York. On opposite corners are the Yokohama Specie Bank and the Bank of Japan

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ESTABLISHED 1855

THE IRON AGE

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Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 425 Park Square Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 7338 Woodward Ave. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Construction and Prosperity

IT was a common saying, fifteen years and more ago, that supplying the ordinary everyday needs of the population, to sustain its existence, required only about three-fourths of our working capacity. Thus, for a condition of real prosperity to prevail, it was estimated that about one-fourth of the work possible to be done needed to be put into improvements or activities involving advancement. The proportion stated was merely a rough guess, but the idea was widely prevalent. When everything was active and incomes were good this disposal occurred, and the advancement represented investment of the savings. When business was poor the saving did not occur.

After considerable study the National Industrial Conference Board some time ago estimated that the average savings in the years 1909 to 1914 inclusive were one-sixth of the income, or 17 per cent. As there were good times and bad times in those years, the finding of a 17 per cent average is not out of harmony with the conception of a 25 per cent maximum.

Two things often said lately may be considered in the light of the memory of pre-war times. One is that we must be in rather sound economic position because, among other things, credit is far from being strained and national income is running high. The other thing said frequently is that we are not really prosperous because the majority of individuals are not getting along very well, are not advancing and improving their material position.

It rather seems that we are spending too much of our income on ordinary living expenses. It does not necessarily follow from this that we are extravagant in our expenditures. The widespread use of the automobile is much criticized, but the automobile is a wonderful invention. It performs remarkable service in proportion to the materials and labor involved in its construction. We are entitled to have automobiles, just as we became entitled long ago to have running water in our homes and later to have electric current for lighting, washing, ironing and toasting.

If a rejoinder is made that statistics show we are doing a great deal of constructing the answer is that the statistics commonly cited are dollar statistics. Building statistics expressed in square feet or cubic feet make an unfavorable comparison with years before the war. The fact that dollar statistics present a favorable comparison simply makes it all the worse. The money is being spent, much of it borrowed money, and the *quid pro quo* is not being received.

In the eighteen-nineties there was much complaint about "overproduction" in this line and that. The real difficulty was that there was not enough construction and advancement to take up the slack. We seem now to be making for a similar condition, not because we do not wish to build or do not have plans, but because building of all sorts has been made so difficult and expensive.

The president of one of the largest automobile companies recently stated that his company is now building cars with one-half the number of man-hours required in 1920. That entitles, and encourages, the automobile to be used more freely. In buildings, which we should pursue as an investment of our surplus working force, there is no such trend. We lack the prosperity and advancement involved in building many large and better homes, better factories, additional power plants, improved factories, etc., to the extent that would be represented by 20 to 25 per cent of our national income. That would come nearer to real prosperity.

Steel Menaced Again

SUNDAY, April 20, was one of the newspaper red letter days for revolutionary displacements of steel. First there was the proposal of Vice-President Atterbury of the Pennsylvania Railroad and his associates to take over Muscle Shoals for the manufacture of an alloy of aluminum and magnesium. This alloy, Mr. Atterbury said, would be lighter than steel, almost as strong as soft steel, and cars made from it would weigh so much less than steel cars that loads could be increased 17 per cent with no increase in cost, and thus transportation rates could be reduced. He had first learned of this remarkable metal from an officer of a captured German Zeppelin.

The metal described at the Washington hearing and others like it—as elektronmetal and duralumin—have long been well known to American metallurgists, but the latter have never

entertained Mr. Atterbury's dream of its potentialities in the reduction of freight rates by displacing steel in car construction. They have so implicitly taken what Mr. Atterbury and other railroad executives have told them of freight rates being practically all labor cost that they are loath to believe now that aluminum-magnesium cars are the long-sought solvent of our railroad problem.

Also on Sunday we had the word of a research organization that "the position of steel is being threatened by those who have been pioneering in the fields of the alloys" and that "the inventor who can produce a new metal with the strength of steel, non-corrosive, and lighter in weight, is already on the horizon." Be it noted —though the headliner missed it—that no claim is made of the production of the new metal on a commercial basis as a competitor of steel. Meanwhile, as steel plants are operating at a high rate, their owners find a measure of security in the margin of 1000 to 1500 per cent in the cost of the "revolutionary" metal.

Finally, the Sunday paper told the world of "a new process for the production of sponge iron," resulting from experimental work of the Bureau of Mines at the University of Washington in Seattle. Here was an accurate account of new work along very old lines, with the careful statement that the production of steel from sponge iron has theoretical advantages over present standard methods. The author's restraint had nothing in common with the "revolutionary" exploitations on other pages, for he admitted that "the possibility of making sponge iron and converting it to steel without passing through the stage of pig iron production has been suggested from time to time and hundreds of so-called 'direct steel' processes have been proposed or tried during the past century."

However, the spirit that urged on hundreds before springs eternal, for we read further:

> There is some hope that sponge iron can be briquetted and melted in the open-hearth steel furnace without too much oxidation. If this could be accomplished a much larger field of usefulness would be opened up for cheap sponge iron.

But oxygen, the ancient enemy, still roams the earth.

Great Advance in Hardness Testing

NON-DESTRUCTIVE testing of metals has been the subject of three articles in recent issues of THE IRON AGE. Methods of determining hardness have been employed for years and new apparatus for such tests has appeared from time to time. Heretofore these tests have been applied in much the same manner as physical or chemical tests, samples of steel being taken as representative of considerable tonnages.

Ascertaining the hardness of large quantities of steel by individual or 100 per cent examination is comparatively new. Certainly its application on a large scale commercially is recent. In THE IRON AGE of March 20 the practice of a large company in New Jersey of testing the relative Rockwell hardness of all the small parts of thin metal used in calculating machines was described. The application of the Brinell test to every heat-treated axle by a large motor car maker was referred to in our issue of April 10. Like valuable results from the unique machine developed by the same company to measure the hardness of cylinder blocks were discussed last week. The hardness test is now applied to all knuckles and wrist pins instead of to a few as before. Some companies are controlling their heat treatment of ball races and other parts in a similar manner.

Regulation of foundry practice and close control of operations in the hardening room are also made possible and other applications are rapidly developing. Hardness testing is thus taking its place alongside of X-ray and magnetic analysis as a guaranty of uniform quality for the product of large-scale operations.

Old Principles Restated

FIFTEEN fundamental principles for the conduct of business are set down in the report of the Committee on Business Ethics of the Chamber of Commerce of the United States which will be submitted at the annual meeting of the chamber in Cleveland, May 6 to 8. As one reads the statement of these principles, carefully compiled by a committee of successful men of business, he is impressed by the fact that it really embodies nothing that is not covered by the Golden Rule and the Ten Commandments. But those time-honored guides of conduct are brought up to date; that is, old principles are amplified in language to meet modern conditions.

Beginning with the statement that the foundation of business is confidence, which springs from integrity, fair dealing, efficient service and mutual benefit, the document describes how the reward is a fair profit, how the rights of employers and employees must be respected, and how unceasing study of facts and forces affecting business are essential to lasting success. An important and well-stated fundamental is the seventh, namely: "Contracts and undertakings, written or oral, are to be performed in letter and in spirit. Changed conditions do not justify their cancellation without mutual consent." Business has been cursed with the tendency to find excuses for breaking contracts, the commonest breach being the cancellation of a purchase order because the market has declined. Some lessons were learned in 1920, but how well learned we have yet to find out. In steel short-time buying has postponed the real test.

Very properly waste in all forms is condemned, as are business excesses, including the various forms of inflation of credit, while unfair competition is strongly denounced. Sometimes men as members of a company will do things that they would not do as individuals; hence one paragraph declares that corporate forms do not absolve from or alter the moral obligations of individuals.

Lawful cooperation among business men in support of these principles is commended, and finally it is declared that business should render restrictive legislation unnecessary, by so conducting itself as to deserve and inspire public confidence.

The Chamber of Commerce committee has

found a new way of stating old truths that cannot too frequently or too vigorously be driven home. Law-makers tend to emphasize the power of organized business to do the public harm. Why not better recognition of the great things organized business has done in setting up standards which the man who would stay in business must live up to—in short, in making business honest?

Relative Coke Production

THE fact is well known that as demand for coke varies the production of beehive coke fluctuates much more than does the production of by-product coke. When demand falls off it is beehive ovens that go out first. The process is the more expensive of the two, and there is more merchant coke produced by beehive than by by-product ovens, while when requirements fall off the greater decrease is in the call for merchant coke. The by-product process is naturally a continuous one and it is highly desirable to keep the ovens warm.

While the general swing of beehive coke production, varying much more widely than by-product coke production, is well known, study of the precise movements month by month is of interest, and particularly so because monthly operations show such sensitiveness to the rule. For a simple and exact comparison the relatives given in the table below have been computed. In each column the figure is a relative to the average production of the commodity during the whole period. The table starts with June, 1921, when the collection of monthly statistics of by-product coke output was resumed.

In the 34 months—June, 1921, through March, 1924—the averages per month were 2,490,436 gross tons of coke pig iron, as shown by THE IRON AGE blast furnace report, 958,700 net tons of beehive coke, 2,536,400 net tons of by-product coke and 3,495,000 net tons of total coke, as reported by the Geological Survey.

Monthly Production Relative to Average Production in Period Covered

	Pig Iron	Beehive Coke	By-Product Coke	Total Coke
June, 1921	43	24	56	47
July	35	19	51	42
August	38	26	55	47
September	40	30	56	49
October	50	43	68	61
November	57	50	70	64
December	66	54	73	68
January, 1922	66	52	74	68
February	65	57	71	67
March	82	77	84	82
April	83	55	87	78
May	93	45	100	85
June	95	48	102	87
July	97	47	98	84
August	73	56	71	67
September	82	63	88	82
October	103	91	111	105
November	107	118	116	116
December	124	128	121	123
January, 1923	130	154	122	131
February	120	154	111	123
March	142	182	128	143
April	142	185	127	142
May	155	190	132	148
June	148	183	126	141
July	148	165	129	139
August	138	156	128	136
September	125	143	123	138
October	126	134	122	126
November	116	115	116	116
December	117	105	118	116
January, 1924	121	120	122	121
February	124	126	118	120
March	139	140	127	131

An incidental use of the table is to show that the total output of coke does not vary so much as the output of pig iron. Coke is used for other purposes than making pig iron, and the demand in these other quarters is relatively steady. When, in July, August and September, 1921, pig iron production was only 35 to 40 per cent of its average in the whole period, coke production was 42 to 49 per cent of its average. On the other hand, when in May, 1923, pig iron was 55 per cent above its average coke was only 48 per cent above its average, and a similar phenomenon appears for March of this year. In the entire period the total production of coke was 1.40 net tons of coke to one gross ton of pig iron. In making pig iron the consumption of coke was about 1.1 net tons.

In the entire period the coke proportions were 72.6 per cent by-product and 27.4 per cent beehive.

As to beehive coke production showing by far the wider variations, the low point all around was in July, 1921, when pig iron production was 35 per cent of the average, but beehive coke got down to 19 per cent and by-product coke went down only to 51 per cent. On the other hand, when in May, 1923, pig iron went to 55 per cent above its average, beehive coke went 90 per cent above and by-product coke only 32 per cent above.

The table of relatives shows other interesting things. In the coal strike of 1922 beehive coke went down sharply, while by-product coke was able to increase, partly through stocks and partly through shipments of coal from unusual sources.

So rapid are the fluctuations in relative production that the respective items are rarely together. The one month that showed production of pig iron and the two grades of coke at their average was November, 1923, while a nearly average month was December, 1923.

THE heavy rail shipments to Japan in January and February were a continuation on a larger scale of a movement which has been a feature of our foreign steel trade since the war. Rail exports to Japan in January were more than half the total and in February more than a third. In the five years since the war, or 1919 to 1923 inclusive, out of 2,115,400 gross tons of rails exported by American mills, Japan absorbed 555,790 tons, or 26 per cent. A comparison with earlier periods emphasizes the magnitude of this movement. In 1913 and 1914 Japan took only about 5.5 per cent of our rail exports. The remarkable increase since the war is a measure of the railroad building that has been so large a factor in the new industrial development of the island empire.

IN every way commendable are the efforts of the American Society for Steel Treating to clear up the looseness and inaccuracy of terms used in connection with the heat treatment of steel. A tentative set of nine general definitions, drawn by a sub-committee of that organization, was made public last month. These have been submitted to other societies. To most of the definitions little objection can be made. They have to do with processes and represent the best opinion of the largest society directly concerned. The coining of "loneal" to fit the practice involved in

heat treating sheets and similar material may be open to question. The burdening of technical language with entirely new words is to be avoided. Possibly "sub-anneal" would better describe the conditions where material is heated to a point below that for regular annealing, or below the recalescence point, followed by cooling. Careful consideration should be given the definitions submitted. The experience represented in such organizations as the American Society for Testing Materials and the Society of Automotive Engineers will be of decided help in shaping the final product. Clearness in conception and exactness in terminology are necessary to the right development of this art, which has made such remarkable strides in recent years.

BETTER TIMES PREDICTED

President Campbell Expects Improvements After Nominations Are Made

YOUNGSTOWN, April 22.—President James A. Campbell of the Youngstown Sheet & Tube Co. predicts an appreciable improvement in business following the Presidential nomination. At the company's annual stockholders' meeting today he blamed Congress and the Senate investigators in particular for creating unrest throughout the country, and thereby retarding business. He said the Sheet & Tube company is expending millions of dollars in improving its properties, installing new equipment and otherwise keeping them abreast of competition. All directors were reelected.

President Campbell stated the saving in annual overhead expense on the Steel & Tube properties alone amounted to $750,000 and on Brier Hill plants, both acquired last year by purchase, $600,000. This was effected, he stated, by dispensing with two high priced organizations. He added:

Costs Reduced

"We intend to sell all properties not in our line of business and we are improving and balancing the others. Production costs have already been reduced in the plants which we acquired, and are to be still further cut."

Business during the first quarter of 1924 has been satisfactory, he stated, but will not equal the figures for the corresponding period of 1923. This he attributed to higher production costs, due to introduction of the shorter work day and lower selling prices. Discussing business conditions, he stated: "The year started well, but toward the end of the first quarter business slowed down. Congress, and more particularly the Senate, is probably to blame for the falling demand. People became alarmed over the investigations. In December everybody expected speedy tax reduction from Congress. The country got investigations instead. A wave of fear spread among the people and everybody is keeping close to the shores in business. And yet business is not bad. It is fairly good, considering these circumstances. What provokes me most is that men whom we send to Washington representing us are not doing anything constructive. They seem to be doing more misrepresenting than anything else. They investigate each other and some outside of their circle. They are working against the interest of the people.

Unemployment Caused

"Congress and the investigators seem to forget that slowing down of business means unemployment for hundreds of thousands. This is more serious for the workers than for the investigators. Our employees desire steady employment more than high wages and it is our greatest aim to give them steady employment. This cannot be done without stable political conditions. The high cost of living is still with us and we are much disturbed about our men.

"The situation, however, seems to be clearing. The oil investigation has run its course. The Government is trying to cancel the leases through the courts, although in my belief they are favorable to the people of the country, as I have said before. Basic conditions are all right. There is plenty of money and prices are fairly good. The stocks of oil are going down and the price of oil is advancing. The farmers, with the exception of the wheat belt, are fairly prosperous. The railroads have bought a lot of equipment and are still buying. Cotton is selling at a high price and the South is in excellent shape as the result. Building in most centers is only slightly below the record year of 1923.

"If Congress will pass a tax law bringing relief to investors and at the same time to workers and salaried men with smaller incomes, conditions will speedily right themselves."

The Iron Age and Its Readers

SUGGESTIONS on how THE IRON AGE may be made of maximum usefulness are always in order—for the benefit of readers as well as for the guidance and inspiration of the editors. Some time ago an unusually stimulating letter was received, in which among other things our correspondent outlined a promising practice of holding occasional brief conferences of plant executives over industrial developments as found in the business press. He would supplement the orderly circulation of each copy through the plant as designated by "reading slips" (such as THE IRON AGE supplies for the asking, printed for pasting on the front cover of each copy with the names of those expected to read portions of it) by a discussion "once a week or even once a month. A very good idea of the individual breadth of vision of the subordinates," he urged, "would thus be obtained."

Among other things he also said: "I got more current information and help from advertising pages during my apprenticeship than I could tell you in writing, and some persistent campaigning among responsible officials of firms would seem to be almost morally incumbent on publishing houses of your caliber. My early experiences as a subscriber and reader and now as occasional purchaser have given me perhaps fuller appreciation of what an important part the technical press fills in the country's industrial life. While my present employers' use of these opportunities is not so full and thorough as I would like to see it, I hope that many others of your readers and advertisers have better conditions to report."

Iron and Steel Markets

FURTHER SLACKENING

Pig Iron and Steel Output Reduced as Demand Lessens

Automobile Body Sheets Reduced—Some Contraction in Foundry Operations

Adjustment of steel output to demand has made further progress this week, with accompanying evidence of some contraction of activities, though by no means marked, in consuming industries. Largely the withholding of orders is seen to be due to an expectation of buyers that prices will yield further.

Yet with all the pains consumers are taking to keep their stocks of steel at the lowest point, shipments from the mills appear to be nearly up to the average of 1923 and the volume of construction work and of railroad consumption compares favorably with that of March.

Blast furnace shut-downs are more numerous in the Pittsburgh and Valley districts, eight furnaces there having been banked or blown out in the past week as against five in the week preceding and three other Valley furnaces are scheduled to stop by the end of the month.

Steel production in the Pittsburgh and near-by districts, including Youngstown, is now at about 75 per cent of capacity, whereas the average in March was somewhat over 90 per cent.

The recession in operations is more rapid than that which began in May, 1923, since order books then had generous backlogs.

While the Steel Corporation's policy in meeting competition has applied chiefly to plates, structural shapes and bars, the situation in other products is now attracting more attention. On Tuesday independent makers of automobile body sheets announced a reduction of $5 a ton or to 5.10c. base.

The general sheet market also has felt the shutting off of shipments to automobile plants. Black sheets, which recently were on a 3.75c. basis, have sold as low as 3.60c., Youngstown. Sheet mill operations are now at about 65 per cent of capacity.

Best estimates of the rate of renewed automobile output, following May sales, put it below the average for the first four months.

The structural steel trade is still the brightest spot. New lettings call for some 20,000 tons, well distributed among public work, private work and railroad bridges, while fresh inquiries exceed 50,000 tons, one-half for commercial enterprises and one-fourth for public work, largely in New York.

There is little new in railroad equipment and the next car inquiries are expected from Western lines. The Chesapeake & Ohio purchases of cars total 8115, taking over 100,000 tons of steel. The Florida East Coast has bought 25 locomotives.

Concrete bar business is large, but is not the expected seasonal increase over recent months. Competition is keen and at the expense of prices, owing to uncertainty as to how long demand will hold up to the present scale. Concrete road building in the East should take this year 50,000 tons of bars.

Sellers of pig iron are more disposed to make concessions to get business, but the orders thus produced have been few and tonnages small. Southern iron has declined 50c., foundry iron at Cleveland $1, and at Pittsburgh the reduction is 50c. on the principal grades.

Foundry pig iron output still keeps ahead of consumption and more merchant furnaces will go out. A survey of the foundry industry shows that, apart from the curtailment in automobile castings that began in March, the past fortnight has brought a slight falling off in railroad malleables and in some gray iron lines. In sanitary and radiator castings production holds up well, with strong building demand.

The declines in pig iron have brought THE IRON AGE composite price to $21.96, compared with $22.50 last week, $30.79 one year ago and $21.98 two years ago.

The finished steel composite price now stands at 2.696c. per lb., having fallen from 2.703c. last week. One year ago it was 2.824c. and two years ago 2.084c. per lb. The present level is the lowest in almost fourteen months.

Pittsburgh

Cautious Policy Prevails as Production Is Being Curtailed

PITTSBURGH, April 22.—Decline in steel business has been even more marked in the past week than it was previously, and the chief reason is found in a growing conviction among buyers that lower prices are immediately ahead. Growth of this idea in no small measure is due to the recent official announcement that the Steel Corporation was meeting competition. Many buyers interpreted this announcement to embrace other products beside plates, shapes and bars and there has

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 22, 1924	Apr. 15, 1924	Mar. 25, 1924	Apr. 24, 1923
No. 2X, Philadelphia‡	*$22.76*	$23.26	$24.13	$32.76
No. 2 Valley furnace†	*21.50*	22.00	23.00	31.00
No. 2, Southern, Cin'ti†	*26.05*	26.55	26.55	31.05
No. 2, Birmingham, Ala.†	*22.00*	22.50	22.50	27.00
No. 2 foundry, Chicago*	24.00	24.00	24.50	32.00
Basic, del'd, eastern Pa.	21.50	21.50	21.50	30.25
Basic, Valley furnace	*21.50*	21.75	21.75	31.00
Valley Bessemer, del. P'gh.	*24.26*	24.76	24.76	32.77
Malleable, Chicago*	24.00	24.00	24.50	32.00
Malleable, Valley	*21.50*	22.50	22.50	31.00
Gray forge, Pittsburgh	*22.76*	23.26	23.76	32.27
L. S. charcoal, Chicago	29.15	29.15	29.15	36.65
Ferromanganese, furnace	107.50	107.50	107.50	125.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	45.00
O.-h. billets, Pittsburgh	40.00	40.00	40.00	45.00
O.-h. sheet bars, P'gh.	*41.00*	42.50	42.50	46.00
Forging billets, base, P'gh.	45.00	45.00	45.00	55.00
O.-h. billets, Phila.	45.17	45.17	45.17	50.17
Wire rods, Pittsburgh	51.00	51.00	51.00	51.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	*2.25*	2.30	2.30	2.50
Light rails at mill	2.00	2.00	2.00	2.25

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.52	2.52	2.52	2.825
Iron bars, Chicago	2.35	2.35	2.40	2.60
Steel bars, Pittsburgh	2.30	2.30	2.40	2.50
Steel bars, Chicago	*2.35*	2.40	2.50	2.84
Steel bars, New York	2.64	2.64	2.69	2.84
Tank plates, Pittsburgh	2.30	2.30	2.35	2.50
Tank plates, Chicago	*2.45*	2.50	2.60	2.84
Tank plates, New York	2.54	2.54	2.59	2.84
Beams, Pittsburgh	2.30	2.30	2.35	2.50
Beams, Chicago	*2.45*	2.50	2.60	2.84
Beams, New York	2.59	2.59	2.69	2.84
Steel hoops, Pittsburgh	2.90	2.90	2.90	3.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon 1.75 to 2.25. ‡Silicon 2.25 to 2.75.

Sheets, Nails and Wire,	Apr. 22, 1924	Apr. 15, 1924	Mar. 25, 1924	Apr. 24, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	*3.70*	3.75	3.75	4.00
Sheets, galv., No. 28, P'gh.	*4.85*	4.90	4.90	5.25
Sheets, blue an'l'd, 9 & 10	2.85	2.85	2.90	3.25
Wire nails, Pittsburgh	3.00	3.00	3.00	3.00
Plain wire, Pittsburgh	2.75	2.75	2.75	2.75
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.80
Tin plate, 100-lb box, P'gh.	$5.50	$5.50	$5.50	$6.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$16.50*	$17.00	$18.50	$26.50
Carwheels, Philadelphia	*17.00*	17.50	18.50	26.00
Heavy steel scrap, P'gh.	*15.00*	16.00	18.00	25.00
Heavy steel scrap, Phila.	15.00	15.00	16.50	23.00
Heavy steel scrap, Ch'go	*13.50*	14.00	15.50	22.00
No. 1 cast, Pittsburgh	*18.00*	18.50	20.00	27.00
No. 1 cast, Philadelphia	*17.00*	18.00	18.50	25.00
No. 1 cast, Ch'go (net ton)	*18.00*	18.50	19.50	25.00
No. 1 RR. wrot. Phila.	*17.50*	18.50	19.00	26.00
No. 1 RR. wrot. Ch'go (net)	*12.25*	12.75	13.50	20.50

Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$4.00	$6.00
Foundry coke, prompt	4.75	4.75	4.75	7.00

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**13.75**	13.62½	13.87½	17.00
Electrolytic copper, refinery	13.25	13.25	13.50	16.75
Zinc, St. Louis	**6.12½**	6.07½	6.37½	7.10
Zinc, New York	**6.47½**	6.42½	6.72½	7.45
Lead, St. Louis	7.62½	7.75	8.85	7.90
Lead, New York	7.90	8.12½	9.00	8.00
Tin (Straits), New York	**49.50**	49.25	52.50	45.62½
Antimony (Asiatic), N. Y.	9.87½	10.00	12.00	8.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, April 22, 1924, Finished Steel, 2.696c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

April 15, 1924,	2.703c.
March 25, 1924,	2.731c.
April 24, 1923,	2.824c.
10-year pre-war average,	1.689c.

Composite Price, April 22, 1924, Pig Iron, $21.96 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

April 15, 1924,	$22.50
March 25, 1924,	22.73
April 24, 1923,	30.79
10-year pre-war average,	15.72

been less business in sheets, pipe and wire products, notwithstanding that the Steel Corporation has had no particularly low prices to meet in pipe or wire products and has been ignoring lower prices of independent sheet makers.

The spirit of caution among buyers has increased to the point where the comparison now is made between current business and that of some months in 1921, when matters were so slow. Demand for steel from the automotive industry just now is probably as light as it was three years ago, sale of stocked automobiles apparently not having increased to a point where the makers feel justified yet in increasing their production schedules. Independent makers of automobile sheets today announced a reduction of $5 a ton base (No. 22 gage) to 5.10c. While this cut comes following a sharp decrease in the demand, it is said to have been under contemplation for some time, since perfection of manufacture had permitted some reduction in costs. In sharp contrast with the conditions of a year ago, when the slowing down in business found the steel mills with generous backlogs, the present lull finds few manufacturers with any considerable amount of business on their books and instead of a gradual curtailment of production as was possible a year ago, the recession this year is rapid.

In this and nearby districts ingot production is down to 75 per cent or slightly less, as against a general average of slightly above 90 per cent in March. In the past week no less than eight blast furnaces have been banked or blown out, these including one Duquesne furnace, Carnegie Steel Co., one National Tube Co. stack, McKeesport, Pa., one Eliza, and the Soho furnace of the Jones & Laughlin Steel Corporation, one furnace of the Bethlehem Steel Co., Johnstown, Pa., one Hazelton furnace, Republic Iron & Steel Co. and the two Josephine, Pa., furnaces of the McKinney Steel Co. These suspensions, together with those of

last week, bring the number of furnaces now in production in this and nearby districts down to 101, out of a total of 139 furnaces. At least three other Valley furnaces are scheduled to cease production by the end of this month.

An effort to stimulate business in pig iron is seen in a cut of about 50c. a ton in the leading grades by merchant producers. Consumers, however, are too well supplied and are figuring on buying at even lower prices when they again are in need of supplies.

Continued lack of demand from consumers has resulted in still further price decline in scrap. The situation in coke and coal still is dull and depressed.

Pig Iron.—The continued indifference of buyers is beginning to tell on prices and producers are beginning to modify their ideas. Bessemer iron now is offered at $22.50, Valley furnace, basic at $21.50, No. 2 foundry at $21.50 and malleable also at that price. So far as the test has gone, buyers are no more interested at the new prices than they were at the old ones and it begins to look as if the pursuit of a trading level would result in even lower prices. The claim is still made that prices are below costs, but it is also realized that consumers are well protected against their requirements for the next 60 or 90 days and that the iron they have on hand or due from producers is at prices below today's levels. Unsold stocks of iron are again pretty heavy and there is also the factor that middlemen have not succeeded in disposing of all of their purchases of last November and they are increasingly anxious to do so. It is reported that a local maker of railroad car parts recently closed for 6000 tons of basic iron, but the business went to an affiliated pig iron producing interest without competition. Otherwise the business of the week has been in carload lots and even such sales have not been numerous.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.50
Bessemer	20.50
Gray forge	$21.00 to 21.50
No. 2 foundry	21.50 to 22.00
No. 3 foundry	21.00 to 21.50
Malleable	21.50 to 22.00
Low phosphorus, copper free	29.00

Ferroalloys.—Ferromanganese is inactive, but firm in price, the high cost of the ore serving as a check upon efforts to stimulate demand by cutting prices. Activity also is absent in the other ferroalloys, but recent prices are holding fairly well. Fair demand is observed for ferrovanadium and ferrotungsten. Prices are given on page 1255.

Semi-Finished Steel.—Recent action of Youngstown mills in writing down the contract price of sheet bars to $41 has established that price as the market and while some makers still are quoting $42.50, this now is merely an asking price, and probably cannot be done, since production in general exceeds the demand. The billet market locally still is $40 and slabs are quoted at the same figure, but there is not enough demand to test the strength of that price. Skelp is quoted at 2.30c. by most makers, but it is admitted that an attractive inquiry would produce a price of 2.25c., and that price or less is believed to have been done on skelp sold as strip steel. Rods are in very limited demand, but the open market price remains at $51 base, probably because of a doubt among makers that a lower price would bring out increased demands. Steel production still is contracting in this and the Youngstown districts, with the Steel Corporation doing about 85 per cent and the independent about 70 per cent. Prices are given on page 1255.

Wire Products.—While business reaches fairly large proportions in the aggregate, it still is well below the average of other years at this season and consumers and distributors are buying so close to their known requirements that the mills are having little trouble in keeping abreast of their orders. Prices are holding well, except for the equalization of freights in competitive territory, but buying is so conservative generally that it is doubted that business would be helped by lower prices. High wage scales among the building trades are holding up building and the demand for nails and the demand from the agricultural districts is restricted by the low prices of farm products and a backward planting season, which causes doubts among the farmers as to the future. Prices are given on page 1254.

Steel Rails.—It is impossible to chronicle any improvement in the light rail situation. With coal mining operations at an even lower rate than was reached in the 1921 depression, the demand for mine rails is exceedingly light. Makers still are holding billet rails at 2c. base, but it is a purely nominal figure in the absence of buying of any considerable volume. Such business as is coming out is going chiefly to the rail steel rail makers, whose prices are at least $2 to $3 a net tone lower than those of the billet rail makers.

We quote light rails: rolled from billets, 2c. base (25-lb. to 45-lb.); rolled from rail steel, 1.85c. to 1.90c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Pipe business still is good, particularly in comparison with that in other finished lines. Jobbers are specifying well on merchant pipe, although the backwardness of the spring is retarding the movement of such goods from jobbers' stocks and in some districts the jobbers, anxious to lighten their loads, are not adhering strictly to the usual jobbing discounts. This secondary weakness in prices, however, is not affecting mill prices, which, on both merchant and oil country pipe, are holding remarkably firm. Current business in oil country pipe is practically equal to mill capacity. There has been a marked absence of line pipe business so far this year, and the mills, which ordinarily have a good tonnage of these goods on their books at this season, now have only moderate tonnages; this condition has resulted in some price concessions by one or two of the independent makers. A number of line pipe projects are in prospect, but it now appears that the largest one, that of the McCorkle Line Pipe Co., which originally called for 850 miles of 4-in. to 10-in. pipe, will be cut to about 400 miles of 8-in. and 10-in. pipe, the company having encountered some difficulty in securing a right of way for the longer end of its projected line. Boiler tubes still are dull and weak, with quotations and actual selling prices rather remotely related. Discounts are given on page 1254.

Sheets.—Effective April 20, two leading independent makers of automobile body sheets have reduced the price $5 a ton to 5.10c. base (No. 22 gage). This change has not yet been followed by the American Sheet & Tin Plate Co., but it is believed it will be, for such a change has been under consideration for some time by all makers and probably would have been made regardless of the slump in automobile production and consumption of steel. Competition from full pickled sheets has been increasing and automobile body builders for several months have been pressing for a price more in line with the black sheet base, on the ground that costs did not justify the automobile body sheet differential. The reduction recognizes that claim. The general sheet market is weak, particularly on black sheets, sales of which have been made as low as 3.60c. base, by a Youngstown district mill. Softness in prices, however, has not produced business but rather has caused increased caution among buyers and an actual falling away in orders. This tendency has been intensified by the recent official statement that the Steel Corporation was meeting competition which many have interpreted as applying to sheets. The sheet-making subsidiary of the Steel Corporation has not been meeting competition and disclaims any immediate intention of doing so. Contraction in sheet orders has affected mill operations of all producers, and it is doubtful if capacity is as much as 65 per cent engaged this week. Makers of automobile sheets have only one to two weeks' business in sight. Prices are given on page 1254.

Tin Plate.—Production has outstripped the absorptive ability of container manufacturers and this has caused some slowing down in plant activities, though as yet this is seen in the working a fewer number of turns per week than in the closing down of mills. It

is believed there will be an outlet for all the tin plate that has been produced or will be made this year, but the backwardness of the planting season has thrown doubts about the crop prospects and naturally there is no rush of can orders yet. Announcement of third and fourth quarter prices has not yet been made, but the common belief is that the present prices of $5.50 per base box Pittsburgh for standard cokes will be continued.

Cold-Finished Steel Bars and Shafting.—This line is as slow as it was in the depressed times of 1921, largely because of the curtailment of automobile production, since other consuming industries are buying fairly well. The price remains at 3c. base Pittsburgh for carload lots or more, but there is so little business passing that this has become an untested figure. There is no disposition to shade it now, since it is not believed business would be better at a lower price. Ground shafting holds at 3.40c. base, f.o.b. mill, for carload lots or more.

Hot-Rolled Flats.—The market still holds fairly firm on the hoop sizes, but there is not much real strength in the wider material, since business is light, on account of the slowing down in automobile production and capacity is so big, especially when jobbing, skelp and bar mills are added to strip mills, that competition for business is keen. The prevailing price on strips is 2.75c. base Pittsburgh, but on wide material a lower price has been done. Mills here have not had to go under 2.90c. on hoop business, but on bands have encountered 2.75c. Makers of cotton ties are not disturbed by reports of a price on foreign ties of $1.44½, delivered at Gulf of Mexico ports, although, based on the present price of hoops, the domestic mills would have to name a price of $1.50 per bundle of 45 lb. It is claimed that no samples of foreign ties are given and orders have to be placed well in advance of shipments to insure deliveries. Prices are given on page 1254.

Cold-Rolled Strips.—Demand is slow because of the light demand from the automotive industry, but a strong effort is being made to maintain the regular price of 4.75c. base Pittsburgh, notwithstanding that less has been done on large lots.

Bolts, Nuts and Rivets.—Business shows no appreciable improvement and prices still are easy, since open capacity is large and there is much competition for orders. On large machine bolts, 60, 10 and 5 per cent off list is a common quotation and hot-pressed nuts are selling as low as 4.75c. off list. Large lots of rivets bring out lower prices than are publicly quoted. Prices and discounts are given on page 1254.

Plates.—The common price within the area which Pittsburgh mills have a freight advantage over outside mills is 2.30c. base, but on car business 2.25c. is freely quoted and on business in competitive districts local mills have gone as low as 2.20c. to secure desirable orders. The Steel Corporation still has a fair size backlog of plate business, but that is not the case with most of the independent mills. Prices are given on page 1254.

Track Supplies.—Railroads are specifying fairly well, but new business is not keeping pace with completed orders and backlog business is steadily melting away. Prices do not change much. They are given on page 1254.

Coke and Coal.—Production of beehive oven coke is on a diminishing scale, but so also is the demand and consequently there has been no strengthening of prices. Standard furnace coke for spot or prompt delivery still is quoted from $3.75 to $4 per net ton at ovens, with the lower figure predominating. A Buffalo furnace interest seeking 4000 to 5000 tons of furnace coke for May shipment was quoted $3.75 by several producers. An inquiry has appeared here from Buffalo calling for 12,000 tons of furnace coke per month for six months beginning May 1. These are the only inquiries of any consequence lately presented. Spot foundry coke is quotable from $4.75 to $5.25, with the demand only moderately active. Efforts of West Virginia coal operators to reduce wages have been resisted by the men and this has tended to retard such action in the Connellsville district. It is probable that any change in wages in the near future will result from action from the men rather than by the mine and oven operators. It is doubted that lower prices for coal and coke which might be possible through reduced wages would stimulate business and the tendency, therefore, is to let production run down. As consumption of coal is less because of the lower rate of industrial activity, stock piles are not decreasing very rapidly and fresh purchases are limited. It is doubtful whether coal mine operations were lower in the 1921 depression than they are now, but light production is not much of a price factor with demand so limited. Slack coal still is scarce and firm at $1.50 to $1.75 per net ton at mines. We quote mine run steam coal $1.50 to $2, mine run coking coal of the better sorts $1.75 to $2 and mine run gas coal at $2.25, all per net ton f.o.b. mines.

Structural Material.—The full range of prices on large structural beams in this teritory is from 2.25c. to 2.40c., with 2.30c. appearing most frequently on strictly local business. Mills in this district seeking business in competitive territory, however, have not found it possible to stop at 2.25c., if the order was desired. Structural lettings locally have been few and small, but most of the shops here have a fair amount of business in sight. Plain material prices are given on page 1254.

Iron and Steel Bars.—Demand for steel bars has dwindled to very limited proportions since such large users as makers of cold-finished steel bars and of bolts, nuts and rivets just now are experiencing a very poor business. As far as local business is concerned, the price is right around 2.30c. base, Pittsburgh. On one or two fair-sized inquiries, however, a price of 2.25c. has appeared, but the claim also is made that as much as 2.40c. has been obtained on small lots. A quotation as low as 2.20c. has been made by some mills, but on business in competitive territory. Iron bars are slow, but makers here are making an effort to maintain the minimum of 3.10c., base, on refined iron bars.

We quote soft steel bars, rolled from billets, at 2.25c. to 2.40c. base; bars for cold finishing or screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.25c. to 2.40c. base; refined iron bars, 3.10c. to 3.15c. base, in carload lots or more, f.o.b. Pittsburgh.

Old Material.—Prices continue to sag in the lack of any definite improvement in consumptive demand and the efforts of dealers to find an outlet for material which must be moved. Prices still are based on sales of distress lots and there is some doubt that large tonnages could be secured at the prices given, since some dealers have begun to throw down material on their yards and this tends to lessen the offerings. Very low prices have been made on recent railroad offerings. Report of sale of No. 1 cast at $19.50 last week was an error; the price was $18.50.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel	$15.00 to $15.50
No. 1 cast, cupola size	18.00 to 18.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	18.00 to 18.50
Compressed sheet steel	13.00 to 13.50
Bundled sheets, sides and ends	12.00 to 12.50
Railroad knuckles and couplers	17.50 to 18.00
Railroad coil and leaf springs	17.50 to 18.00
Low phosphorus blooms and billet ends	18.50 to 19.00
Low phosphorus plate and other material	18.00 to 18.50
Railroad malleable	15.50 to 16.00
Steel car axles	17.50 to 18.00
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	17.50 to 18.00
Machine shop turnings	12.00 to 12.50
Sheet bar crops	16.50 to 17.00
Heavy steel axle turnings	14.50 to 15.00
Short shoveling turnings	13.50 to 13.00
Heavy breakable cast	16.00 to 16.50
Stove plate	13.50 to 14.00
Cast iron borings	12.50 to 13.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	15.00 to 15.50

Chicago

Buyers Very Conservative, But Some Good Tonnages Booked

CHICAGO, April 22.—The placing of 7500 freight cars by the Chesapeake & Ohio is the most important development in the week. Over 100,000 tons of steel is involved and it is expected that fully 50 per cent will be furnished by a local mill. The structural field holds out promise of broad activity, particularly in Chicago, although according to late advices action on the Stevens Hotel, a 20,000-ton project, has been postponed for 30 days.

The automobile industry is being closely watched for signs of a possible recovery from its recent slump and already sales of cars are said to have developed in gratifying volume following the arrival of fair weather. Few observers, however, believe that automobile output will again reach the high rate of the past winter before next fall at the earliest. It is pointed out that car producers this year anticipated the usual spring demand and when that demand is satisfied operations will depend on summer sales which are ordinarily smaller than for the spring and fall seasons.

Mills continue to find new business less plentiful, but this fact is probably accounted for by the unsettling influence of recent price weakness rather than by any material decline in consumption. For the time being buyers are following a waiting policy pending stabilization of the market. It cannot be said, however, that business is entirely inactive. Sizable tonnages are still being booked, as indicated by individual orders for 12,000 tons of structural shapes, 7000 tons of rails, 4000 tons of billets and 2400 tons of tie plates taken by a Chicago mill during the week. It would also be an inaccuracy to state that the order books of local producers are seriously depleted. On the contrary, the tonnage which is now being scheduled for rolling is still large, as evidenced by current operations which are only slightly below the high rate achieved last month.

Such concessions in prices as have been made have been largely to protect the market generally served by Chicago mills from encroachments by producers east of here, who are apparently not nearly so well committed and are reaching far afield for business. On plates and shapes, 2.50c., Chicago, is the usual quotation, although 2.45c. is rapidly becoming less uncommon. On soft steel bars 2.35c. to 2.40c., Chicago, represents the market range. Sheets are still very weak, no doubt because that commodity is to a larger extent dependent on the automobile industry than other forms of finished steel. Business in wire products is disappointing and output has dropped to 60 per cent.

Among the primary materials both pig iron and scrap are quiet and soft. A merchant blast furnace is going out today and another stack will probably be blown out in the near future.

Pig Iron.—In an exceedingly quiet market prices have undergone no real test. It is apparent, however, that $24.50, local furnace, has disappeared as a going quotation and that prices are now on a single level of $24 base. Sales are few and cover small lots ranging from carloads up to 100 or 200 tons. Southern foundry has been sold at both $22 and $22.50, base Birmingham, for all rail shipment. Southern foundry for barge and rail delivery has been sold at $24.68, delivered, which is substantially equivalent to the delivered price from local furnaces. Merchant iron production in this district will undergo a reduction with the blowing out this week of an Iroquois stack. This furnace, which is to be relined, has produced over 800,000 tons since its last relining in 1920. It is also probable that one of the two Federal furnaces will be blown out soon for repairs. Merchant stacks still in operation include two Iroquois, two Federal, one Mayville furnace and the Zenith stack at Duluth. An appraisement of foundry operations in the Chicago district indicates that nothing resembling a general reduction in melt has taken place. Melters serving the automobile industry, particularly malleable foundries, have curtailed operations rather sharply and are finding it necessary to suspend deliveries of pig iron. It is estimated that this group is now producing at a 40 to 50 per cent rate as compared with recent full operations. General jobbing foundries in the Chicago metropolitan area are likewise less busy and probably are not melting at more than 50 to 60 per cent of capacity. Reports from the St. Louis and Cincinnati districts indicate a slowing down in the stove business, but in Chicago and Michigan foundries serving the stove and hot air furnace industry are running at a high rate. Manufacturers of sanitary ware and radiators are producing practically at capacity, reflecting sustained activity in building, especially residential construction. Cast iron car wheel makers are running full and manufacturers of steel castings for railroad use are estimated to be on a 75 to 80 per cent basis. Foundries identified with the agricultural implement industry are running at an unchanged rate which, however, has at no time exceeded 50 per cent. It is apparent, therefore, that the principal change has been in the automobile industry and a quick comeback in motor car output is not out of the range of possibilities, although it is more probable that after the present surplus of cars has been disposed of the recovery in production will reach a point intermediate between the present reduced rate and the high rate of the past winter.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	24.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00
Malleable, not over 2.25 sil.	24.00
Basic	24.00
High phosphorus	24.00
Southern No. 2	$28.01 to 28.51
Southern No. 2 (barge and rail)	24.68
Low phos., sil. 1 to 2 per cent, copper free	30.50 to 31.00
Silvery, sil. 8 per cent	37.29
Electric ferrosilicon, 14 to 16 per cent	45.42

Ferroalloys.—The market is quiet, with prices unchanged.

We quote 80 per cent ferromanganese, $115.06, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, $42.56 to $43.56, delivered.

Cast Iron Pipe.—No signs of reaction in demand are to be observed. In fact, purchases of small lots by the smaller municipalities are growing heavier. The United States Cast Iron Pipe & Foundry Co. will furnish 800 tons for Niles Center, Ill. Summit County, Ohio, takes bids April 24 on 1000 tons of 6- to 16-in. inclusive. KingsFord, Mich., receives tenders May 5 on 900 tons of 4-, 6- and 8-in. Saginaw, Mich., takes figures April 29 on 200 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $60.20 to $62.20; 6-in. to 10-in., inclusive, $56.20 to $58.20; 12-in. and above, $55.70 to $56.20; class A and gas pipe, $5 extra.

Plates.—The Chesapeake & Ohio has thus far placed 7500 freight cars out of a total program of 8200. It is estimated that 95,000 tons of steel will be required by the cars thus far ordered, not counting the axles, which will involve 13,000 or 14,000 tons additional. The Standard Oil Co. of Louisiana is in the market for tank roofs at Baton Rouge, La., calling for 5000 tons. New commitments of Western mills continue to recede and prices are still giving way. Prices are notably firmer in the immediate Chicago district than in outlying points, where the freight advantage over mills east of here is less marked. Attractive tonnages in desirable specifications are bringing out quotations of 2.45c. Chicago, while 2.50c. is the more commonly named figure.

The mill quotation is 2.45c. to 2.50c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Structural Material.—The Santa Fe system has placed bridge work involving 4500 tons with the American Bridge Co. A number of other large tonnages are at the point of closing, while others will soon come up for figures. The Stevens Hotel, Chicago, requiring 20,000 tons, is expected to be placed shortly and the general contract for the Lake Shore Athletic Club, calling for 7000 tons, has been awarded to J. B. French. Chicago projects on which bids are expected to be asked shortly include the Hotel Sherman addition, 10,000 tons; the Masonic Temple, 6000 tons, and the Hotel Morrison addition, 4000 tons. In the plain material market competition continues keen and on attractive specifications as low as 2.45c., Chicago, has been done.

The mill quotation on plain material is 2.45c. to 2.50c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Omitting the automotive industry and a few other interests such as manufacturers of bolts, nuts and rivets, actual consumption of steel in Chicago and the Middle West is well maintained. Even the recession in automobile manufacture is regarded as temporary in view of the encouraging volume of retail car sales which followed the arrival of fair weather. The explanation for the slackening rate of steel buying seems to lie not so much in a contraction of industrial activity as in a general expectation of lower prices. Recent reductions have caused buyers to restrict their purchases and this policy will be adhered to until the market is again stabilized. Soft steel bars are now freely available at 2.40c. Chicago, and desirable orders have been placed at 2.35c. On bar iron 2.40c. Chicago has practically disappeared as a going quotation and 2.35c. is the ruling price. Rail steel bars are weak at 2.30c. mill.

Mill prices are: Mild steel bars, 2.35c. to 2.40c., Chicago; common bar iron, 2.35c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.65c. to 2.75c. base; hoops, 4.45c.; bands, 3.95c.

Sheets.—New business is light and specifications are below expectations. Prices continue to show rather wide fluctuations with no indications of any recovery of stability. Japanese inquiries for sheets are still before the trade and there is no fear of any boycott as a result of the recent unpleasantness over the immigration issue. It is pointed out that Japan's exports to the United States greatly exceed her imports from this country.

Mill quotations are 3.65c. to 3.85c. for No. 28 black, 2.85c. to 3c. for No. 10 blue annealed and 4.85c. to 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago: 4c. for blue annealed; 4.70c. for black and 5.60c. for galvanized.

Wire Products.—Jobbers continue to buy from hand to mouth and business from manufacturing users is sagging. Freight car builders, however, are purchasing nails in good quantity and orders from the railroads are fair. Wire mill operations probably do not average much over 60 per cent. Although prices are showing some flexibility here and there, the market is remarkably well maintained, all conditions considered. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1254.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Reinforcing Bars.—A considerable amount of highway tonnage has been placed during the week, and the outlook for business in this field is particularly promising in Illinois because of the evident effort of the incumbent administration to place all possible road contracts before November. There have been few concrete bar lettings for buildings, notwithstanding the large number of projects pending. Among new prospects, the proposed addition to the Ford Motor Co. plant at Hegewisch, Ill., is expected to require approximately 500 tons. Keen competition has forced warehouse prices on concrete bars to a lower level and the ruling market now appears to range from 2.65c. to 2.75c., Chicago. Lettings include:

Roberts & Oake packing plant, Chicago, 470 tons to Joseph T. Ryerson & Son.

Pittsburgh Plate Glass Co. plant, Milwaukee, 300 tons to Kalman Steel Co.

Illinois State highway work, 200 tons to Kalman Steel Co.

Wisconsin road work, 100 tons to Concrete Steel Co.

Michigan road work, 100 tons to Kalman Steel Co.

Wisconsin road work, 125 tons to Kalman Steel Co.

Ford Motor Co. assembly plant, St. Paul, Minn., 500 tons to Kalman Steel Co.

Pending business includes:

Brown-Camp Hardware Co. building, Des Moines, Iowa, 300 tons.

Ford Motor Co. plant addition, Hegewisch, Ill., 500 tons.

Roosevelt Road viaduct, Chicago, 100 tons.

Illinois Woman's Athletic Club, Chicago, 100 tons.

Apartment building, Grand Avenue, Milwaukee, 180 tons.

Monterey apartment building, Chicago, 100 tons.

Bolts and Nuts.—New business is so light that it is difficult to state what ruling prices are. Suffice it to say, discounts are still exceedingly weak.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ⅝ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ⅝ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Rails and Track Supplies.—Local bookings during the week have been confined to miscellaneous lots, outstanding among which were 2400 tons of tie plates, 7000 tons of rails, and 800 tons of angle bars. The light rail quotation must be considered nominal in view of lack of demand.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Old Material.—A steel mill last week bought a few thousand tons of heavy melting at $14 per gross ton delivered, but no consumer is now willing to pay that much, and not alone heavy melting, but a large number of other grades are notably weaker than seven days ago. Demand is exceedingly light in all departments of the market, and, what is more, expiring orders are rapidly being filled. Railroad offerings include the Chicago & Alton, 1900 tons; the Elgin, Joliet & Eastern, 250 tons, and the Wabash, 300 tons of rerolling rails.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$17.50 to	$18.00
Cast iron car wheels	16.50 to	17.00
Relaying rails, 56 and 60 lb.	26.00 to	27.00
Relaying rails, 65 lb. and heavier	27.00 to	32.00
Forged steel car wheels	17.00 to	17.50
Railroad tires, charging box size	16.50 to	17.00
Railroad leaf springs, cut apart	17.50 to	18.00
Rails for rolling	15.50 to	16.00
Steel rails, less than 3 ft.	17.00 to	17.50
Heavy melting steel	13.50 to	14.00
Frogs, switches and guards cut apart	14.00 to	14.50
Shoveling steel	13.25 to	13.75
Drop forge flashings	10.50 to	11.00
Hydraulic compressed sheets	12.00 to	12.50
Axle turnings	13.00 to	13.50
Steel angle bars	15.50 to	16.00
Steel knuckles and couplers	17.00 to	17.50
Coil springs	18.50 to	19.00
Low phos. punchings	15.50 to	16.00
Machine shop turnings	7.50 to	8.00
Cast borings	10.50 to	11.00
Short shoveling turnings	10.50 to	11.00
Railroad malleable	18.50 to	19.00
Agricultural malleable	17.50 to	18.00
	Per Net Ton	
Iron angle and splice bars	16.50 to	17.00
Iron arch bars and transoms	17.00 to	17.50
Iron car axles	24.50 to	25.00
Steel car axles	16.50 to	17.00
No. 1 busheling	10.25 to	10.75
No. 2 busheling	8.00 to	8.50
Cut forge	12.00 to	12.50
Pipes and flues	7.50 to	8.00
No. 1 railroad wrought	12.50 to	12.75
No. 2 railroad wrought	12.00 to	12.50
No. 1 machinery cast	18.00 to	18.50
No. 1 railroad cast	17.50 to	18.00
No. 1 agricultural cast	17.50 to	18.00
Locomotive tires, smooth	14.75 to	15.25
Stove plate	15.00 to	15.50
Grate bars	14.00 to	14.50
Brake shoes	14.50 to	15.00

New York

Buying of Pig Iron and Finished Materials Extremely Light

NEW YORK, April 22.—The past week has been one of extreme dullness in pig iron, and not one of the tonnages reported last week as pending has been placed. The Worthington Pump Corporation inquiry for 1750 tons for June and July delivery has not been withdrawn, as reported, but is held in abeyance for the present. Prices are weak and untested, with Buffalo at from $21.00 to $21.50, and eastern Pennsylvania $21.50 to $22.00.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$25.27 to $25.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.77 to 25.27
East. Pa. No. 2, sil. 1.75 to 2.25	24.27 to 24.77
Buffalo, sil. 1.75 to 2.25	25.91 to 26.41
No. 2X Virginia, sil. 2.25 to 2.75	31.44
No. 2 Virginia, sil. 1.75 to 2.25	30.44

Ferroalloys.—No improvement in demand for ferromanganese or spiegeleisen is noted. Sales are still confined to carload and small lots, although one transaction of 150 tons of ferromanganese made by a domestic producer for use in the Philadelphia district is noted. Sales of spiegeleisen have aggregated possibly 200 tons in the last week. Competition between the British and domestic spiegeleisens is fairly keen and in most cases domestic producers are meeting this. Where competition is not involved the domestic product brings a dollar or so per ton higher price. Very little new business has appeared in the ferrosilicon or ferrochromium markets but specifications on contract are satisfactory.

Cast-Iron Pipe.—The market is quiet. Buying of water pipe is largely confined to private purchasers of small lots. Prices continue unchanged, as there are no large municipal tenders to really test the market. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Jobbers' stocks of soil pipe are still fairly large and buying is extremely light. Locally a few sales are being made to plumbers. Makers are booked ahead for about 30 days. We quote discounts of both Southern and Northern makers, f.o.b. New York, as follows: 6-in., 29½ to 30¾ per cent off list; heavy, 39½ to 40¾ per cent off list.

Warehouse Business.—Only small lots and a light volume of orders are the chief features of the market in this district. Shading of prices on structural material is noted, but it is believed that the lower prices are being made on foreign steel that has recently begun to arrive. Sheet prices continue fairly strong, with only a slight inclination by sellers to offer concessions of a few cents per 100 lb. On the whole, prices are holding despite the dullness of business, and the lower mill prices being quoted. Bolts and screws are weak and there has been shading. Brass and copper products continue to show a downward tendency. Sellers of wrought iron and steel pipe report only a moderate degree of buying, although this is usually the active season. There has been some shading in this market, also. We quote prices on page 1268.

Finished Iron and Steel.—Buying is at a low ebb; stocks in consumer hands appear large enough to stand some withdrawals; new purchasing is in smallest possible amounts in view of the fact that deliveries are prompt; beliefs are common that prices have not yet stabilized; competition among both makers and users of steel is keen because of the uncertainty of the immediate future, and producers seem resigned to a colorless market for an indefinite period. Prices show a wide range, with more emphasis than usual that the basis of any sales to large consumers is special and not to be regarded as the market. Importation of steel, apart from the deterrent of rising European exchange, is less of a concern than recently, as buyers in increasing numbers do not see good policy in patronizing Europe, particularly as European mill representatives admit the offers to sell are more or less a temporary condition. In a few special cases American producers have actually met the European price, or substantially so, rather than give customers an opportunity of complaining of throwing away a chance of good profit. Parallel to this are the low prices sometimes made to close on export orders. Fabricated steel business is still conspicuous and promising. Bookings in concrete bars are generally not much better than March, although seasonally they should be on a larger scale. Demand for concrete road construction will be sustaining, and in the East will probably total 50,000 tons. Two large projects likely to be settled soon call for 2700 tons, 1500 for the Philadelphia Electric Co. and 1200 tons for a bridge for the Pennsylvania Railroad. Awards of concrete bar business include the following:

To the Concrete Steel Co.: 450 tons for the General Baking Co. and 350 tons for the Merchants' Refrigerating Co., New York.

To the Kalman Steel Co.: 400 tons for the American Can Co., Kansas City; 400 tons for a school at Reading, Pa.; 100 tons for the Western Electric Co. at Philadelphia; 150 tons for a bridge at Springfield, Mass.; 100 tons for paving in New Jersey and 300 tons for paving in New York.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.64c. to 2.69c.; plates, 2.54c. to 2.59c.; structural shapes, 2.59c. to 2.69c.; bar iron, 2.54c.

Coke.—Demand is light but prices are holding fairly well to a range of $5 to $5.25 per ton for prompt shipment carloads of standard foundry and about $4 for standard furnace. Distress tonnages are occasionally available at slightly lower prices. By-product is quoted at $10.41, Newark and Jersey City, N. J.

Old Material.—Although the market is obviously weak, prices show but little change. Heavy melting steel is unchanged from last week, railroad quality for eastern Pennsylvania delivery being quoted at $14.50 to $15 per ton delivered. The buying price on cast borings is from $10 to $10.25 per ton, New York. Borings and turnings are going forward to eastern Pennsylvania consumers at $13 to $13.50 per ton, delivered. Machine shop turnings are quoted at $13 to $14 delivered, depending upon the freight rate to consuming plant. With $14 being paid for specification pipe delivered to a Lebanon, Pa., consumer, $10.25 about represents the New York buying price. Stove plate continues weak at $13.50 per ton delivered New Jersey and $15 delivered to eastern Pennsylvania consumers.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$11.00 to $11.50
Steel rails, short lengths, or equivalent	11.75 to 12.25
Rails for rolling	16.00 to 16.50
Relaying rails, nominal	25.00 to 26.00
Steel car axles	17.00 to 18.00
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	14.00 to 14.50
Forge fire	9.75 to 10.25
No. 1 yard wrought, long	13.00 to 13.50
Cast borings (clean)	10.00 to 10.50
Machine-shop turnings	9.25 to 10.25
Mixed borings and turnings	10.00 to 10.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	10.25
Stove plate	11.00 to 11.50
Locomotive grate bars	12.00 to 12.50
Malleable cast (railroad)	14.00 to 15.00
Cast iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$17.00 to $17.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 16.50
No. 1 heavy cast, not cupola size	12.00 to 12.50
No. 2 cast (radiators, cast boilers, etc.)	14.00 to 14.50

Takata & Co., with offices at 50 Church Street, New York, since the building was opened, have removed to larger quarters in the new Westinghouse Building, Broadway and Liberty Street, New York.

Boston

Slightly More Interest in Pig Iron, but Prices Remain Unsettled

BOSTON, April 22.—For the first time in several weeks, foundries display more interest in pig iron. The improvement is slight yet encouraging. In the past week a western Massachusetts foundry bought 1000 tons No. 2 plain second quarter Buffalo iron, and a New Britain, Conn., hardware manufacturer an equal amount of Buffalo No. 1X, and there was an increase in carlot business. A Connecticut fittings maker is feeling out the market on a round tonnage of low silicon iron; a St. Johnsbury, Vt., plant wants 500 to 1000 tons No. 2X third quarter iron; a local manufacturer is inquiring on 270 tons of malleable; and inquiries for one, two and three cars of regular foundry, off and charcoal irons are more numerous. Buffalo No. 2 plain and No. 2X are offered at $21.50 furnace. Eastern Pennsylvania at $21.50 furnace is offered more freely, and foundries maintain less can be done. Some Pennsylvania furnaces hold to $22.50 furnace base. Virginia and Alabama iron prices are unchanged. Little information is to be had on foreign iron. The last sale reported was Continental silicon 2.75 to 3.25 at $23 on dock here duty paid. Although spotty, the foundry industry in general appears a little more active. Low prices are being quoted on castings, however, especially on municipal work.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$25.65 to $26.15
East. Penn., sil. 1.75 to 2.25	25.15 to 25.65
Buffalo, sil. 2.25 to 2.75	26.41 to 26.91
Buffalo, sil. 1.75 to 2.25	26.41
Virginia, sil. 2.25 to 2.75	32.42 to 33.42
Virginia, sil. 1.75 to 2.25	31.92 to 32.92
Alabama, sil. 2.25 to 2.75	33.10
Alabama, sil. 1.75 to 2.25	32.60

Shapes and Plates.—The indicated boom in construction work calling for structural steel apparently is dissipated. The new Statler Hotel, Boston, and a local theater are the only sizable steel projects in the market today. Shapes are holding steady at 2.25c., Pittsburgh. The market for plates is now 2.20c. to 2.15c., the latter figure not being quoted freely. Business the first two weeks in April started slightly better than in the last half of March, but during the past week has dropped to almost the vanishing point. No projects are in prospect locally, buying being of an occasional carlot or less by a boiler shop on account of some definite order, or a dealer to keep stocks balanced. Fabricators are buying a few plates from time to time as needs require.

Warehouse Business.—The movement of iron and steel out of stock continues moderately active, with individual sales conservative. Warehouse stocks are still comfortably large and well assorted. Independent of any action on the part of mills, warehouse prices on wire nails have been dropped 20c. a keg. The market for bolts and nuts is about 10 per cent lower.

Soft steel bars, $3.51½ per 100 lb. base; flats, $4.40; plain and deformed concrete bars, $3.76½; small angles, channels and tees, $3.51½; structural steel, large angles and beams, $3.61½; tire steel, $4.80 to $5.15; open-hearth spring steel, $5 to $8; crucible spring steel, $12; steel bands, $4.31½ to $5.20; hoop steel, $5.80 to $6.30; cold rolled steel, $4.35 to $4.85; toe calk steel, $6.15; heavy plates, $3.61½; light plates, $3.86½; diamond pattern plates, stock sizes, $5.90; blue annealed sheets, $4.51½; refined iron bars, $3.51½; best refined iron bars, $4.75; Wayne, $5.50; Norway rounds, $6.60; Norway squares and flats, $7.10.

Coke.—The reduction in by-product foundry coke from $12.50 to $12 a ton delivered, recently announced by the New England Coal & Coke Co. and the Providence Gas Co., has failed to stimulate the movement of such fuel. A majority of iron melters in this territory have sufficient coke on hand to carry them through April unless working schedules are unexpectedly increased. It is believed, however, the coke market will display greater activity in May. The movement of New England coke into the Buffalo and New Jersey districts continues free.

Old Materials.—Business in old materials continues semi-stagnant, recent transactions being confined to carlots here and there, mostly steel and steel turnings. Prices are heavy under their own weight rather than because of any concerted effort to depress the market. New England foundries display slightly more interest in No. 1 machinery cast, but only at price concessions. Holders are not inclined to shade values, however, consequently actual transactions are few and far between. The Boston & Maine Railroad tomorrow will close bids on 70 to 75 cars of miscellaneous scrap.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$21.50 to $22.00
No. 2 machinery cast	18.00 to 18.50
Stove plates	15.00 to 15.50
Railroad malleable	18.00 to 19.00

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to $11.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.50 to 11.00
Wrought pipe (1-in. in diam., over 2 ft. long)	9.00 to 9.50
Machine shop turnings	8.50 to 9.00
Cast iron borings, chemical	10.50 to 11.00
Cast iron borings, rolling mill	8.50 to 9.00
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap and bundled skeleton	9.00 to 9.50
Shafting	15.00 to 16.00
Street car axles	15.00 to 16.00
Rails for rolling	12.50 to 13.00

Buffalo

Pig Iron Buying Light—Irregularity in Prices of Finished Material

BUFFALO, April 22.—Inquiry for the week has been very light, as has the amount of business placed. Of the 2000-ton inquiry for foundry and malleable put out by the Massey-Harris Co. of Batavia 1000 tons is believed to have been placed. The price is not known but considerable concession must have been made, it is believed, since the business was offered at less than $20. Foundry of a silicon content of 2.25 to 2.75 and of 2.75 to 3.25 was sought. The Worthington Pump Corporation inquiry for 1750 tons has not been withdrawn but is being held in abeyance, as is the American Hardware Corporation inquiry of 1000 tons. The inquiry this week ranges over approximately 3000 tons. The Fairbanks inquiry of 1000 tons is included in this, also a 500-ton inquiry from Connecticut; a 500-ton inquiry from Vermont and a 300-ton inquiry from Connecticut. While furnaces are endeavoring to maintain something of a front against low price encroachments, it is believed that resale iron is being obtained at considerably under what the furnaces ask. A quantity of this is available in this district, being held by brokers who are said to have purchased it at $21 and who must decline to carry it any longer. The going minimum price is $21.25 to $21.50 on small lots, with No. 2 foundry, 2.25 to 2.75 silicon, available at $21.50.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$22.00
No. 2. foundry, sil. 2.25 to 2.75	$21.00 to 21.50
No. 2 plain, sil. 1.75 to 2.25	21.00 to 21.50
Basic	21.50
Malleable	21.00 to 21.50
Lake Superior charcoal	29.28

Finished Iron and Steel.—Some lessening in the amount of the inquiry since the first of the month has occurred. Weakness in bars, shapes and plates prevails. Bar prices are quoted from 2.30c. to 2.40c, with 2.30c. the going price and one or two instances where this material has been offered at 2.25c. Shape and plate prices run from 2.30c. to 2.40c, with the lower figure more generally quoted. Absence of oil field development and ship construction has made the plate market almost dead. Shape business is better. A good deal of structural business is going forward. The Liberty Bank job of 3850 tons went to the American Bridge Co. though the 400 tons of reinforcing bars has not yet been let. A local fabricator took 250 tons on an export job for the United Fruit Co. Bids went in on the 500 tons of reinforcing bars for the M. Wile & Co. factory addition Monday and some smaller concrete bar business has been booked. The Dunkirk high school contract for 400 tons is believed to have been placed. Sheet business

has slowed down. The theoretical price for black is 3.75c., but 3.65c. has been done. The slackness of the automotive trade has kept inquiry down. Seneca Iron & Steel Co. has reduced its sheet mill operation to 60 per cent.

Pipe jobbers seem to be pretty well loaded, apparently having over-specified somewhat. Tin plate books for second half will probably be opened later in the month. General mill operation is about 70 to 75 per cent.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold-rolled and round shafting, 4.45c.

Old Material.—Very little buying has taken place during the week. Mills are accepting only an occasional tonnage. One mill continues to turn back all shipments. Small transactions in heavy melting steel, No. 1 cast, malleable, machine shop turnings and cast iron borings have taken place. Heavy steel quotation is $14.50 to $15. Cast price is $18.25 to $19; malleable, $19 to $19.50; turnings, $11 to $11.75, and borings, $12.50 to $13. Most of the prices are nominal. Dealers' transactions are responsible for what little activity there is, the dealers apparently being agreed that this is a logical time to buy for yard stocking purposes. Foundry operation is pretty slack and open-hearth operation has been further reduced.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$14.50 to $15.00
Low phos., 0.04 and under	20.00 to 21.00
No. 1 railroad wrought	14.50 to 15.00
Car wheels	18.00 to 18.50
Machine shop turnings	11.00 to 11.75
Cast iron borings	12.50 to 13.00
No. 1 busheling	15.00 to 15.50
Stove plate	16.00 to 16.50
Grate bars	16.00 to 16.50
Bundled sheet stampings	10.00 to 11.00
Hydraulic compressed	15.00 to 15.50
Railroad malleable	19.00 to 19.50
No. 1 machinery cast	18.25 to 19.00

Cincinnati

Extremely Quiet Week in Pig Iron—Lower Prices on Southern Grades

CINCINNATI, April 22.—Last week was the quietest of the year in the pig iron market, it being estimated that less than 500 tons was sold in this market. It is expected that a Cincinnati manufacturer of furnaces will close for 800 tons today, 500 standard grades and 300 of special iron. Southern iron is very quiet, no sales of larger than carloads being reported. On a round tonnage, $22, Birmingham, has been quoted by a furnace, and this price has been done on resale iron. On southern Ohio irons the lowest price reported to date has been $23, Ironton, and it is said there is no disposition on part of furnaces to go lower. Basic, Bessemer and silvery irons are inactive, and only occasional sales of charcoal iron are reported.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	26.55
Ohio silvery, 8 per cent	35.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.77
Basic Northern	23.77
Malleable	25.27

Sheets.—A local furnace company has been placing orders for galvanized sheets, and it is said that a price of 4.80c. was named on part of the business. Sheet orders generally are confined to fill-in tonnages. Can makers in this district report business continues good, though in some sections demand has slackened somewhat on account of lateness of crops. Prices are about the same as last week, the market now being 2.85c. for blue annealed, 3.70c. for black, and 4.85c. for galvanized, with a possibility of these prices being shaved $1 per ton on attractive orders.

Structural Activity.—The week was a quiet one in structural activities, though one project involving 3000 tons was bid on. There were no lettings of importance. It is expected that a number of projects involving an aggregate of 5000 tons will be awarded this week.

Reinforcing Bars.—Inactivity marked the past week, no new projects of size having appeared, though a number of small buildings were brought out. The Kalman Steel Co. will supply 400 tons for the addition to the Miami Valley Hospital at Dayton. Prices of rail steel bars range from 2.10c. to 2.30c., mill, while on new steel the range is 2.20c. to 2.30c., mill.

Warehouse Business.—Local warehouses report a steady flow of small orders, but the aggregate tonnage is falling off compared with the month of March. Prices are steady, there being no change from the quotations in effect since last fall.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled round, 4.25c.; cold-rolled flats, squares and hexagons, 4.25c.; open-hearth spring steel, 5c. to 6c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, 3.60c.; common wire nails, $3.50 per keg base; cement coated nails, $3 per keg.

Finished Materials.—There was little business placed during the past week, the majority of the orders being for one and two carload lots, and for immediate delivery. The Louisville & Nashville Railroad placed an order for 900 tons of plates, reported to have gone to a Southern mill, on which a price of 2.25c., Pittsburgh, was quoted by a number of Northern mills. The Standard Oil Co. of New Jersey is in the market for a number of stills, and a Kentucky fabricator has an inquiry out for 2500 tons of plates in connection with this work. The Big Four Railroad has not yet placed orders for its second quarter requirements on which bids were taken several weeks ago. There is little activity in shapes or bars, and it is said that an attractive order could be placed at 2.25c., whereas present quotations are 2.30c. Several carload orders for cold-rolled steel were booked last week at 3c., though several mills are quoting as low as 2.85c. Hoops and bands are quiet, the market ranging from 2.75c., to 3c. Wire products are in slightly improved demand, with prices being fairly steady. Common wire nails are quoted at $3 per keg, mill, and Pittsburgh district independents are naming this price and absorbing part of the freight into this district.

Coke.—There is little activity in coke, and while prices are unchanged from last week, it is said an attractive order would bring out sizable concessions.

Connellsville furnace, $3.75; foundry, $4.75; New River foundry, $10; Wise County furnace, $4; foundry, $5; by-products foundry, $8, Connellsville basis.

Old Material.—The week was a quiet one in the scrap market, and sales were very light. Prices are still declining, and some of the railroads have withdrawn materials from their lists on account of the low prices offered. Buying prices have been reduced from 50c. to $1 per ton.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton

Heavy melting steel	$11.50 to $12.00
Scrap rails for melting	11.00 to 11.50
Short rails	16.00 to 16.50
Relaying rails	27.50 to 28.00
Rails for rolling	13.00 to 13.50
Old car wheels	12.00 to 12.50
No. 1 locomotive tires	13.00 to 13.50
Railroad malleable	14.00 to 14.50
Agricultural malleable	13.00 to 13.50
Loose sheet clippings	7.50 to 8.00
Champion bundled sheets	9.50 to 10.00

Per Net Ton

Cast iron borings	8.00 to 8.50
Machine shop turnings	7.00 to 7.50
No. 1 machinery cast	17.00 to 17.50
No. 1 railroad cast	13.50 to 14.00
Iron axles	20.00 to 20.50
No. 1 railroad wrought	9.50 to 10.00
Pipes and flues	6.50 to 7.00
No. 1 busheling	8.00 to 8.50
Mixed busheling	5.50 to 6.00
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Brake shoes	10.50 to 11.00

Farrell, Pa., works Carnegie Steel Co. had only three lost time accidents in March and this being the best safety record of any of the plants of the company, that plan will have possession of the safety trophy for April. This is the third consecutive month that the Farrell works has been first in accident prevention.

Birmingham

Pig Iron Openly Quoted at $22 in Sale of 6000 Tons—Market Dull

BIRMINGHAM, ALA., April 22.—Pig iron at $22 per ton, No. 2 foundry, base, was in evidence the past week, but only a limited amount was sold at that price. The larger producers of the product are holding at $23 per ton on the turn of the week. One of the smaller companies with some iron on hand sold 6000 tons on a basis of $22 per ton, No. 2 foundry. The iron sales, other than this tonnage, have been very few, even car lot sales having been accepted by some of the furnace interests. Practically all of the business being transacted now is of the spot variety and is receiving prompt attention. The present pace of production is to be kept up several weeks. But little business is being received from those territories where Southern iron has been in competition with nearer districts.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

No. 1 foundry, 2.25 to 2.75 sil.	$22.50 to $23.00
No. 2 foundry, 1.75 to 2.25 sil.	22.00 to 23.00
Basic	22.50 to 23.00
Charcoal, warm blast	32.00 to 33.00

Cast Iron Pipe.—Lettings for the week add materially to the business on hand, gas and water pipe in particular. Labor employed at the cast iron pipe plants has been assured that there will be steady operation of works for an indefinite period. The lettings come from every direction west of the Mississippi River and in the South, Southwest and Southeast. Municipal contracts are up to expectations. A number of specifications are being bid on, it is announced, which will call for a large tonnage. Soil pipe demand is picking up and some of the larger and more active producers report that there is a large amount of business in sight. Shipments of this product on the whole are greater than the make.

(Quotations for pressure pipe, Class A and B, remain unchanged.)

We quote class B, 4-in. water, $52 to $53; 6-in. and over, $48 to $49; class A, $5 higher; standard soil pipe, $60; heavy gage, $45; standard fittings, $110.

Coke.—There is a little better production of coke in the Birmingham district, a couple of batteries of beehive ovens having been started recently. Coke quotations hold the same range, $5.50 to $6.50, for foundry coke, but the greater portion of the buying is in small lots and prompt delivery being stipulated. Independent coke makers are piling no coke. The coke consumption indicates the activity of the foundries, shops and other plants of the home territory, the outside movements being but little.

Old Material.—Pipe shops, foundries and other interests using more or less old material are still taking the scrap contracted for some time back and are buying only when necessary and in such quantities as are needed for the work in sight. Dealers in old material are a little puzzled as to the effect the low price on pig iron which developed the past week is going to have on the scrap market. Heavy melting steel is showing some weakness, but this is accounted for in the fact that the principal consumer is operating but 50 per cent of its mills. No. 1 cast and stove plate both lead in what little activity there is and hold the same quotations which have been obtaining. The railroads have considerable scrap to offer the open market.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	14.00 to 14.50
Railroad wrought	12.00 to 13.00
Steel axles	19.00 to 20.00
Iron axles	21.00 to 21.50
Steel rails	12.00 to 13.00
No. 1 cast	20.00 to 20.50
Tram car wheels	17.00 to 18.00
Car wheels	16.00 to 17.00
Stove plate	15.50 to 16.50
Machine shop turnings	7.00 to 9.00
Cast iron borings	9.00 to 10.00
Rails for rolling	16.50 to 17.00

Cleveland

Little New Business in Finished Lines—Pig Iron Prices Lower

CLEVELAND, April 22.—Lower prices have brought out a little better volume of small business in steel bars, but generally the market continues very dull and virtually no business is coming from large consumers. A favorable feature of the present situation is that there have been virtually no suspensions or cancellations of steel outside of the automotive industry. In some cases old orders have been cancelled, but have been replaced with definite specifications for equal tonnages. Further weakness has developed in steel bars on which a 2.25c. quotation has appeared. No further concessions are reported on plates for which some orders are being taken at 2.25c. However, the market has pretty well settled down to 2.30c. on steel bars, plates and structural material, and most mills decline to go below these prices. Hot-rolled strip steel is very weak and as low as 2.50c. is reported on wide strip carrying liberal extras. Other quotations range from 2.60c. to 2.70c. On bands 2.75c. and on hoops 2.90c. are the common quotations. Some mills continue to go to 4.50c. on cold-rolled strip steel. In spite of the sharp curtailment of automobile production, reports from Detroit indicate that some car builders are keeping close to maximum output and that Michigan automobile plants are now turning out about 12,000 cars daily, including an output of over 7000 by the Ford Motor Co. In lake shipbuilding the Ann Arbor Railroad is inquiring for a car ferry requiring 300 tons. The building field shows more activity than for several weeks. New inquiry includes considerable building work and about 800 tons for several railroad bridges.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.75c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Pig Iron.—Foundry iron has declined $1 a ton in Cleveland to $23 at furnace for local delivery. In spite of the recent declining prices in the Valley district and Buffalo, local furnaces have been able to hold to $24 for foundry iron because there was not business of sufficient size to test prices. The $1 a ton reduction has resulted from the gradual weakening in the Valley district, where foundry iron is no longer quotable above $22. Malleable iron has been similarly reduced. For out of town shipment Cleveland furnaces are now down to $22, as compared with their recent nominal quotation of $23. One Lake furnace is still holding to $22.50. Buffalo iron is being offered in Cleveland at $21 and quotation of $20.50 is reported from Buffalo. The market continues stagnant. Sales during the week were limited to a very few small lots, the largest being 300 tons. Inquiry is light, the largest being for 500 tons from a Richmond, Ind., melter. Aside from the automobile foundries that held up shipments a few weeks ago, foundries continue to take on iron on contracts without suspensions.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$21.75 to $22.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25.	23.50
Southern fdy, sil. 1.75 to 2.25..	28.00 to 28.50
Malleable	23.50
Ohio silvery, 8 per cent	35.52
Stand. low phos., Valley furn.	28.50

Iron Ore.—Consumers are showing little interest in the ore market and the amount sold for the two weeks after the naming of prices has probably been less than during the corresponding period for many years. Lack of buying is attributed to the inactivity and weakness in the pig iron market and the slowing down of the steel industry. Some consumers have advised ore firms

that they will buy only as needed and will place orders only for a single cargo at a time. Consumers realize that they will have no trouble in getting all the ore they want by following this policy and with good transportation facilities by both rail and water they do not expect trouble in obtaining deliveries at any time during the season. If this hand to mouth buying plan is followed in the next few months, as some sellers expect, consumers will have to come in the market during the fall for ore to carry them through the winter, and a buying movement would not develop until late in the season. Ore stocks are somewhat below normal at this season of the year and amounts at docks and furnaces are over 1,000,000 tons less than a year ago. The total at furnaces and Lake Erie docks April 1 was 24,046,533 tons, as compared with 25,120,836 tons on April 1 last year. The amount at furnaces April 1 was 17,983,944 tons. Daily consumption of Lake Superior ore during March showed little change as compared with February, although owing to the longer month the consumption was larger. The amount was 5,307,769 tons, an increase of 524,970 tons over the preceding month. Interior furnaces in the central district consumed in March 2,890,236 tons, an increase of 333,219 tons over February. Lake front furnaces consumed 2,099,350 tons, a gain of 189,384 tons, and Eastern furnaces consumed 176,788 tons, a loss of 6653 tons as compared with the previous month.

Semi-Finished Steel.—On sheet bars $41 is the generally recognized market. Small lot sales have been made at that price and Valley district mills have revised $42.50 contracts to the new price. Some orders are being held up by sheet mills owing to suspensions in the automobile field. Prices on billets and slabs are not clearly defined in the absence of sales, and mills are holding nominally to $40, although that quotaton delivered Cleveland is reported on a small lot. The McKinney Steel Co. has shut down four open-hearth furnaces.

Sheets.—The demand from the automobile industry picked up slightly during the week, but as a whole the demand is light and limited to early requirements. Prices are weak. Black sheets have been reduced to 3.60c. and blue annealed to 2.85c. On galvanized sheets 4.85c. is a fairly common quotation, but this price is probably not the lowest. The 5.35c. price is being shaded on automobile body sheets.

Reinforcing Bars.—The demand has become more active, but prices are weak. Billet steel bars have been shaded to 2.25c., although 2.30c. is the common quotation. Rail steel bars are nominally held at 2.10c. Road work planned in Pennsylvania this year calls for 1000 miles of reinforcing steel concrete roadbed, but in Ohio cheaper construction requiring little steel is planned in this year's road building program. The Bourne-Fuller Co. has taken 225 tons for the Starling Loving Hospital, Columbus, 230 tons for the Pennsylvania railroad grade crossing elimination, Cleveland, and 200 tons for the Schroth Packing Co., Cincinnati. The Concrete Steel Co. has taken 250 tons for the Libby Owens Sheet Glass Co., Toledo.

Bolts, Nuts and Rivets.—New demand for bolts and nuts is very light and prices are weak. On machine bolts a 10 per cent concession from the regular quotations to 60, 10 and 10 per cent off list has become the more common price for immediate orders. Some producers are refusing to meet the price situation and are curtailing production. Rivets are quiet and weak, with quotations ranging from 2.65c. to 2.75c., but the lower price might be shaded $1 a ton on a desirable inquiry. Two export inquiries each for 50 tons are pending.

Warehouse Business.—In spite of lower mill prices warehouse prices are unchanged, although these are being shaded in some cases.

Coke.—Prices are holding to recent levels and sales continue very light. We quote standard Connellsville foundry coke at $4.75 to $6.50 per net ton at ovens.

Old Material.—Most mills continue to take material on contracts, but there is no market activity. Production of scrap has fallen off, particularly in the automotive field, so that the supply apparently does not greatly exceed the demand to fill old orders. However, some grades have become a drug on the market. This is particularly true of flashings, which have declined $1, compressed steel has declined $1, and a number of other grades were marked down 25c. a ton during the week. The market continues weak, but prices have now gotten down to a point where further sharp declines are not expected. Prevailing prices are not tempting speculation and dealers generally are not laying down material.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$13.75 to $14.00
Rails for rolling	15.25 to 15.50
Rails under 3 ft.	15.75 to 16.00
Low phosphorus melting	16.25 to 16.50
Cast iron borings	10.50 to 10.75
Machine shop turnings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
Compressed sheet steel	11.50 to 11.75
Railroad wrought	10.75 to 11.00
Railroad malleable	17.50 to 17.75
Light bundled sheet stampings	10.00 to 11.00
Steel axle turnings	11.50 to 12.00
No. 1 cast	19.00 to 19.50
No. 1 busheling	9.50 to 9.75
Drop forge flashings	8.50 to 8.75
Railroad grate bars	13.75 to 14.00
Stove plate	13.75 to 14.00
Pipes and flues	8.25 to 8.50

St. Louis

Price Concessions on Finished Materials Do Not Bring Out Business

ST. LOUIS, April 22.—The market for pig iron seems almost dead, with little prospect of improvement before the beginning of the third quarter. Melters are trying hard to make their purchases carry them through the second quarter, and if there is any buying it probably will be on a hand-to-mouth basis. Melters seem to feel that prices will go lower, and are inclined to wait until they actually need material before buying. There is less buying than at any time in more than 18 months, and no inquiries are before the market. The furnace of the St. Louis Coke & Iron Co., at Granite City, which has been in operation since Feb. 8, 1921, was blown out for relining on April 14, and it is expected that the relining will be completed within 30 or 40 days. In the meantime the Carondolet (St. Louis) furnace will be working on basic iron for the remainder of the month. Quotations are merely nominal, and there has been nothing that would test the market. An East Side melter bought 100 tons of 12 to 13 per cent Bessemer ferrosilicon.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Florence and Sheffield (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$26.16
Northern malleable, sil. 1.75 to 2.25	26.16
Basic	26.16
Southern fdy., sil. 1.75 to 2.25 (rail)	27.17
Southern foundry, sil. 1.75 to 2.25 (rail and water)	26.28
Granite City iron, sil. 1.75 to 2.25	$26.31 to 25.81

Coke.—Water gas companies are showing interest in their coke requirements, and inquiries received here amount to between 15,000 and 20,000 tons for delivery over the next 12 months. A few sales of by-product foundry coke are reported. There is little interest in Connellsville grades. Domestic coke is exceedingly quiet.

Finished Iron and Steel.—The reduction of $3 a ton on plates, shapes and bars, made by Chicago mills, has not had the effect of stimulating business. On the contrary, the decline is said to have caused holding up the small amount of business that was under consideration, the trade feeling that perhaps there might be further reductions. Pittsburgh mills, which offered some lines on Chicago basis several weeks ago, have not met the

new prices made by Chicago. Warehouse prices have not yet been adjusted to meet the new Chicago lists. Business is extremely dull.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, ¾-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagons blank, $2.50, and tapped, $2.50 off list.

Old Material.—A few small foundries in St. Louis are buying gray iron for castings, which is the extent of the business being done in old material. Other consumers are not interested, and with the market declining weekly they are not going to exert any buying effort to pull it back. Dealers are buying only such material as they need to fill contracts. Railroad lists show a marked falling off, the lines offering only such material as they must get off their yards immediately. New lists follow: St. Louis Southwestern, 250 tons; Standard Oil of Indiana at Woodriver, Ill., 300 tons; Chicago & Alton, 1900 tons; St. Louis-San Francisco, 500 tons; St. Louis Terminal Railway Association of St. Louis, 1250 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$13.00 to	$13.50
Rails for rolling	15.00 to	15.50
Steel rails less than 3 ft.	18.00 to	18.50
Relaying rails, 60 lb. and under	25.00 to	26.00
Relaying rails, 70 lb. and over	32.50 to	33.50
Cast iron car wheels	16.50 to	17.00
Heavy melting steel	14.00 to	14.50
Heavy shoveling steel	14.00 to	14.50
Frogs, switches and guards cut apart	14.00 to	14.50
Railroad springs	18.00 to	18.50
Heavy axles and tire turnings	12.00 to	12.50
No. 1 locomotive tires	15.75 to	16.25
	Per Net Ton	
Steel angle bars	15.00 to	15.50
Steel car axles	18.00 to	18.50
Iron car axles	25.00 to	25.50
Wrought iron bars and transoms	19.00 to	19.50
No. 1 railroad wrought	12.50 to	13.00
No. 2 railroad wrought	12.50 to	13.00
Cast iron borings	10.00 to	10.50
No. 1 busheling	12.50 to	13.00
No. 1 railroad cast	18.00 to	18.50
No. 1 machinery cast	18.00 to	18.50
Railroad malleable	16.00 to	16.50
Machine shop turnings	7.00 to	7.50
Champion bundled sheets	8.50 to	9.00

Philadelphia

Market Is Quiet and Prices of Finished and Raw Materials Are Slightly Weaker

PHILADELPHIA, April 22.—With the exception of plate mills, steel plants are maintaining a fairly good rate of operation, though not up to the tonnage records of first quarter. Incoming business, however, has had such a complete reversal as to represent now a very unsatisfactory proportion of the tonnage being shipped by the mills. More and more the view is being taken by those searching for an explanation of the business decline of the past month that political uncertainties are largely to blame. This view finds many supporters because of the fact that the steel trade is not the only sufferer from the present condition, some other basic industries also being in a slump.

Finished steel, pig iron and scrap prices reflect further weakness. On the 2800 tons of plates for an Eastern fabricating shop, 2.10c., Pittsburgh, was quoted, and much smaller tonnages have been sold at 2.15c. Bars and shapes are 2.25c. to 2.30c., Pittsburgh. Sheets are decidedly weak, and few mills are attempting to maintain the level of prices announced by the leading interest for second quarter, concessions ranging from $2 to $3 on blue annealed and galvanized and from $2 to $4 on black sheets.

Pig iron is extremely dull and prices are easier. Nearly all grades of scrap are lower than a week ago.

Pig Iron.—A little business has developed in the New York district within the past week, but consumers in and around Philadelphia are taking very little interest in pig iron. Sales are confined almost wholly to carload lots and even these small orders are scarce. With some furnaces quoting No. 2 plain at $22 and No. 2X at $22.50, at furnace, concessions of 50c. a ton have been given on lots of not more than 100 tons. One or two furnaces are attempting to obtain a base price of $23, furnace, on small lots. Makers of low phosphorus iron are meeting foreign competition, with prices from domestic furnaces now ranging from $25 to $26, furnace. In cases where foreign iron has the advantage in inland freight, the furnace price has been below $25. Foreign iron continues to come in, last week's receipts being 600 tons from India and 32 tons from France.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.26 to $23.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.76 to 23.63
East. Pa. No. 1X	23.26 to 24.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	30.17 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.67
Basic delivery eastern Pa.	21.50 to 22.50
Gray forge	22.00 to 22.50
Malleable	23.00 to 23.50
Standard low phos. (f.o.b. furnace)	25.00 to 26.00
Copper bearing low phos. (f.o.b. furnace)	25.00 to 26.00

Ore Imports.—The following shipments of manganese ore were received at Philadelphia last week: From Brazil, 1000 tons; from British West Africa, 4053 tons; from India, 1500 tons.

Billets.—With scarcely enough business to test prices, the range of quotations on open-hearth rerolling billets is $38 to $40 and on forging billets $42 to $45, Pittsburgh.

Plates.—In common with all other steel products, plates have suffered from the slump in demand of the past few weeks. Plate mills are not equalling the production records of March, which even then were considerably below the general average of all steel production. The placing of the plates for the Chesapeake & Ohio Railroad cars has removed one unsettling factor from the market, but it has left the price situation in no better condition. On 2800 tons of plates inquired for by an Eastern fabricating company, some mills bid as low as 2.10c., Pittsburgh. Lots of not more than 100 tons have been sold at 2.15c., smaller lots going at 2.20c. and 2.25c. A passenger steamship for the Southern Pacific Railroad will be built by the Federal Shipbuilding Co., Kearny, N. J., a Steel Corporation subsidiary, and the steel, amounting to a few thousand tons, will undoubtedly be furnished by the Carnegie Steel Co. The Newport News Shipbuilding & Dry Dock Co. will build two boats for the Clyde Line.

Structural Material.—Bridge work constitutes a major portion of current structural steel inquiry, with apartment house projects in Philadelphia a close second. A bridge over the Susquehanna River at Sunbury, Pa., will take 100 tons, which is now being inquired for. Shapes are quoted at 2.25c. and 2.30c., Pittsburgh.

Bars.—Efforts are being made by some mills to "peg" the bar price at 2.25c., Pittsburgh, the quotation now available on lots of a carload or more. On smaller lots 2.30c. and 2.35c. are quoted. The demand for bars has shown a decided falling off in the past few weeks, but consumers are taking in shipments without much reduction in the size of specifications. Jobbers' stocks are in many instances low, but are being replenished only in the most sparing manner. Bar iron is quoted by Eastern mills at 2.20c., Pittsburgh.

Sheets.—Marked weakness has developed in sheets to the extent that most independent mills are no longer making any pretense of maintaining the quotations announced by the American Sheet & Tin Plate Co. a few months ago as applicable to its second quarter contracts. Galvanized sheets are freely quoted at 4.85c., black sheets at 3.65c. to 3.75c. and blue annealed at 2.85c. and 2.90c., Pittsburgh.

Warehouse Business.—Irregularity in prices quoted

by Philadelphia jobbers makes the following list of quotations largely nominal, but there has been as yet no formal reduction. We quote for local delivery as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼ in. and heavier, 3.75c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—Scrap prices, particularly on heavy melting steel, are reaching a point of resistance. That is to say, yard dealers are losing interest in the market and prefer to put scrap into their yards, when possible to do so, rather than ship it at the current low levels. Mills, however, are taking so little interest in the market that no early recovery in prices is indicated. Scrap brokers do not look for any important improvement until the demand for finished steel has taken a turn for the better. Prices as quoted below are in many instances 50c. or more per ton below those of a week ago.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to $15.50
Scrap rails	15.00 to 15.50
Steel rails for rolling	17.50 to 18.00
No. 1 low phos., heavy 0.04 and under	20.00 to 21.00
Couplers and knuckles	18.00 to 19.00
Cast-iron car wheels	17.00 to 17.50
Rolled steel wheels	18.00 to 19.00
No. 1 railroad wrought	17.50 to 18.50
No. 1 yard wrought	16.00 to 17.00
No. 1 forge fire	13.50 to 14.00
Bundled sheets (for steel works)	13.00 to 13.50
Mixed borings and turnings (for blast furnace use)	12.75 to 13.25
Machine shop turnings (for steel works use)	13.00 to 13.50
Machine shop turnings (for rolling mill use)	13.50 to 14.00
Heavy axle turnings (or equivalent)	14.00 to 14.50
Cast borings (for steel works and rolling mills)	13.50 to 14.00
Cast borings (for chemical plants)	15.50 to 16.50
No. 1 cast	17.00 to 18.00
Heavy breakable cast (for steel plants)	15.00 to 15.50
Railroad grate bars	15.00 to 15.50
Stove plate (for steel plant use)	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications)	14.00 to 14.50
Shafting	20.00 to 21.00
Steel axles	20.00 to 21.00

San Francisco

Moderate Increase in Activity in Iron and Steel—Details of Rail Order

SAN FRANCISCO, April 16.—A little more activity is noted in the iron and steel markets in this section of the State during the last two weeks. While this improvement is said to have started locally, it has evidently broadened out with unusual rapidity, judging from the trade reports coming to hand from the southern and central counties for some days past. Importers say there is more inquiry and both mills and foundries announce the booking of an increasing volume of orders, some of them large. Buyers are showing more interest and there is comparatively little hesitancy in meeting the asking figures. This fact is regarded as a very satisfactory feature, in that it indicates a deeper-seated confidence in the stability of the trade for the future. It should be said, however, that the betterment was not unexpected, for there was no real reason for the apparent lull, short-lived though it was, when the trade conditions, based on known requirements for new constructive work in so many sections of the State clearly warranted increased activity rather than otherwise. One of the chief items of interest to the trade is the announcement this week by the Southern Pacific Co. of orders placed for 131,245 gross tons of steel rails for delivery within 12 months. These orders were placed as follows: Tennessee Iron & Railroad Co., 63,000 gross tons; Colorado Fuel & Iron Co., 60,745 gross tons, and the Inland Steel Co., 7500 gross tons. Of this large quantity 31,585 tons are to be shipped before June 30, 1924, and the remainder, 99,660 tons, are to be shipped between Jan. 1, 1925, and April 30, 1925.

Pig Iron.—The arrival of considerable quantities of French and Belgian iron has resulted in some very keen competition between both importers and jobbers, accompanied with shading of prices in many instances. There are all sorts of rumors current as to the extent of price cutting, but everybody is averse to talking on the subject and definite figures are unobtainable. Importers quote French and other continental iron from $27.50 to $29 per ton and in large lots these figures may be shaded about 50c. per ton, depending on grade of material and terms. Scotch and English irons are quoted at $31 to $31.50 and opinions differ as to whether the minimum figure could be shaded on a round lot. Buying is reported as fairly active, with a considerable improvement in the orders from Los Angeles. A fairly large tonnage is on the way, particularly from the continent, but it is all placed.

Finished Iron and Steel.—Trade is moving in a rather quiet way, but it is steady, with every indication of a gradual increase during the next two months. While the first quarter of the year was not up to expectations in volume, it was fairly good in some of the leading lines. The second quarter starts out with better indications and some inquiries for export account which promise large orders in the near future. The outlook for structural steel is exceptionally good. Plans for three new school buildings for this city are nearly completed which will require over 12,000 tons, and bids for some 18,000 tons are now being sought for new edificies in Los Angeles. There is a good inquiry for wire and rods for reinforcement purposes and the prices on these are firmly held. The demand for nails continue large, with several liberal shipments to the Orient during the past month. It is expected the Columbia Steel Corporation will be manufacturing sheets in commercial quantities in the near future, but the officials of the company are not yet ready to make any announcements.

Coke.—Little change is reported in the market for coke, except perhaps that buyers are taking supplies in somewhat larger quantities than for some months. Desirable grades for foundry uses are quoted at $19.50 to $20.50, which is a trifle lower than two weeks ago. Advices from Los Angeles say it is selling there at from 50c. to $1 per ton lower than the local figures given. Three cargoes are reported as on the way, fully three-quarters of which is already sold.

Old Material.—The market remains inactive, with buyers still taking small lots. Prices show scarcely any variation, with $13 to $13.50 per ton as the ruling quotation for heavy melting steel and the lower grades slow to move and weak in price. Receipts are very moderate but there is ample for all present needs. The lull in this branch of the trade has now continued for a considerable period and it occasions some surprise when the present volume of foundry business is considered.

Domestic sales of oak leather belting for March are reported by the Leather Belting Exchange at 434,239 lb. at a total value of $738,641, or an average of $1.70 per lb. This compares with 417,849 lb. in February, valued at $710,761, or an average of $1.70 per lb., and with 441,863 lb. valued at $821,867 in March of last year, or an average of $1.86 per lb. Reports covered about 60 per cent of the total product.

The M. A. Hanna Co., Cleveland, has listed one new ore in its 1924 iron ore analyses book. This is the Knickerbocker, a manganiferous ore from the Cuyuna Range. This ore comes from a mine owned by Emmett Butler which has not been on the market for several years. The operation of this mine has recently been resumed.

FABRICATED STEEL BUSINESS

Another Good Week with Large Addition to Pending List

The awards of fabricated steel coming to light in the past week total 20,150 tons, 35 per cent for private enterprises, over 30 per cent for public work and nearly 30 per cent for railroads. A large increase marks the tonnage of work put under negotiation, amounting to 50,500 tons, of which 60 per cent is for private work, 30 per cent public work and 10 per cent for public service corporations. Awards include:

Dortoe Realty Co., loft building in garment manufacturing district, New York, 1500 tons, to Paterson Bridge Co.

Northern Union Gas Co. building, Kingsbridge Road, New York, 700 tons, to Hay Foundry & Iron Works.

Loft building, 25 West Thirty-sixth Street, New York, 400 tons, to George A. Just Co.

Apartment building, 38 West Fifty-fifth Street, New York, 200 tons, to Paterson Bridge Co.

Garage, Astoria, Long Island, 150 tons, to Bethlehem Fabricators, Inc.

Garage at Lexington Avenue and Twenty-first Street, New York, 300 tons, to McClintic-Marshall Co.

Metropolitan Life Insurance Co., vault work in its building at 1 Madison Avenue, New York, 500 tons, to Post & McCord.

Ludwig Baumann & Co., furniture warehouse in Long Island City, N. Y., 1000 tons, to Levering & Garrigues Co.

Hospital, Woonsocket, R. I., 100 tons, to Eastern Bridge & Structural Co.

United Gas Improvement Co., retort house, Syracuse, N. Y., 300 tons, to Belmont Iron Works.

Virginian Railway, 4 bridges, 800 tons, to American Bridge Co.

General Electric Co., Pittsfield, Mass., plant addition, 700 tons, to American Bridge Co. and 100 tons to Palmer Construction Co., Springfield, Mass.

Malden & Melrose Gas Light Co., Malden, Mass., trestle, 100 tons, to Shoemaker Bridge Co.

United Fruit Co., warehouse and powerhouse (export), 250 tons, to Bancroft-Jones Corporation.

Buffalo Slag Co., DuBois, Pa., plant building, 128 tons, to Bancroft-Jones Corporation.

Wilson Dam, Muscle Shoals, 58 regulating gates, 2000 tons, Newport News Shipbuilding Co., low bidder.

Three Buffalo viaducts, American Bridge Co., low bidder for one requiring 350 tons, and independent bridge company, low bidder for two taking 1800 tons.

Bowler Foundry Co., Cleveland, foundry building, 250 tons, to the Van Dorn Iron Works Co.

State Bank & Trust Co., Cleveland, bank building, 160 tons, to National Iron Works Co.

Terre Haute, Ind., municipal stadium roof, 250 tons plain material, to Jos. T. Ryerson & Son, Inc.

Santa Fe, bridge work for 1924, 4500 tons, to American Bridge Co.

Blanchard Hydroelectric Development, James O. Heyworth, Bowlus, Minn., 386 tons, to Minneapolis Steel & Machinery Co.

Jefferson Office Building addition, Peoria, Ill., 309 tons, to Mississippi Valley Structural Steel Co.

Public School, Denver, Colo., 800 tons, to Midwest Steel Co., Denver.

Youngstown Sheet & Tube Co., blast furnace plant, Indiana Harbor, Ind., 470 tons, to Worden-Allen Co.

St. Louis Southwestern Railroad, car repairs, 300 tons, to Mississippi Valley Structural Steel Co.

Matheson & Higler Zinc Co., addition to rolling mill at La Salle, Ill., 150 tons, to Worden-Allen Co.

Federal aid bridge, Chamberlain, S. Dak., 1200 tons, to Missouri Valley Bridge & Iron Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Public market storage building, New York, 10,000 tons.

Incinerator, 139th Street, New York, 2000 tons.

Los Angeles Gas & Electric Co. power house addition, 1800 tons.

Public Service Corporation, Newark, N. J., coal handling plant, 500 tons.

Department store, Philadelphia, 1500 tons.

Highway bridges, New Jersey, 650 tons.

Central Railroad of New Jersey, lift bridge portion across Newark Bay, 8000 tons, bids in.

Norfolk & Western Railroad, 4 bridges, 800 tons.

Loft building, 40 West Thirty-seventh Street, New York, Samuel Friedberg, owner, 400 tons.

Knights of Columbus building, Brooklyn, 2300 tons.

St. Joseph's School, East Eighty-seventh Street, New York, 500 tons.

Office building, 71-79 West Forty-fifth Street, New York, 800 tons.

Northumberland County, Pennsylvania, bridge over Susquehanna River at Sunbury, 1000 tons.

Luzerne County, Pennsylvania, highway bridge, 300 tons of structural shapes and large tonnage of concrete reinforcing bars; Anthracite Bridge Co., low bidder.

Apartment hotel, Portland, Me., refigured, 650 tons.

Statler Hotel, Boston, 8000 tons, bids taken April 24.

Mahoning National Bank, Youngstown, Ohio, 600 tons.

City Hall, Akron, Ohio, 700 tons.

White Motor Co., Cleveland, plant addition, 600 tons, bids taken.

Carlisle department store, Ashtabula, Ohio, 350 tons.

Corry Hotel, Corry, Pa., 250 tons.

Union Gas & Electric Co., Cincinnati, transmission towers, 3000 tons, bids in.

Office building, Tampa, Fla., 1200 tons, bids being taken.

Poincett Hotel, Greenville, S. C., 700 tons.

Bourne-Fuller Co., warehouse, Cincinnati, 300 tons.

Masonic Temple, Chicago, 6000 tons.

Standard Oil Co. of Louisiana, roofs for oil storage tanks, Baton Rouge, 5000 tons.

RAILROAD EQUIPMENT BUYING

Little Being Figured On—West Looked to Supply Next Buying

The purchases of the Chesapeake & Ohio now total 8115 cars as enumerated below. A locomotive order for 25 engines for the Florida East Coast came to light. What new inquiries appeared are not looked on to eventuate in early business. The East is not counted on to supply much in the immediate future in the way of equipment contracts, though mention is made of the Norfolk & Western's considering 1000 or 2000 box cars.

Freight cars in need of repair on April 1 totaled 172,747 or 7.6 per cent of the number on line, according to the car service division of the American Railway Association. This was an increase of 6833 over the number reported on March 15. Locomotives in need of repair on April 1 totaled 11,558 or 17.9 per cent of the number on line. This was a decrease of 752 compared with the number in need of such repair on March 15.

The Chesapeake & Ohio has placed 8115 cars as follows: 1000 box cars to Pullman Co., 1000 box and 500 hopper cars to Illinois Car & Mfg. Co. (the former actually to the Liberty Car & Mfg. Co.), 2000 hopper cars to Standard Steel Car Co. and 1000 hopper cars each to General American Car Co., American Car & Foundry Co. and Newport News Shipbuilding & Drydock Co., 600 ballast cars to the American Car & Foundry Co. and 15 express cars to the Pressed Steel Car Co.

The Florida East Coast Railroad has ordered 25 locomotives from the American Locomotive Co.

The Missouri Pacific has not yet ordered 1000 automobile cars as erroneously reported last week.

The Bangor & Aroostook has asked for prices on flat cars, with no definiteness of early purchasing.

The American Refrigerator Transit Co. is considering buying 2000 cars.

"Following Up Foreman Training," an address presented by John Calder at the convention of the American Management Association, Oct. 30, 1923, has been published in a pamphlet. Discussion of the address is also given and copies may be obtained from the association at 20 Vesey Street, New York.

Automobile buying in California, reflecting the depression that has overtaken the farmers in that territory, is not equal to the stocks available, according to *Automotive Industries*, but in other sections, inclusive of the Northwest, where the agricultural situation is not of the best, sales are reported not far behind the corresponding period of last year. Then demand was greater than supply; now the supply is greater than the demand, large though this is.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.25c. to 2.40c.

Structural Materials

Beams, channels, etc., base, per lb.....2.25c. to 2.40c.
Sheet piling .....2.40c. to 2.55c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.25c. to 2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.30c. to 2.40c.
Refined iron bars, base, per lb.....3.10c to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....2.90c. to 3.00c.
Bands, base, per lb.....2.75c. to 2.90c.
Strips, base, per lb.....2.75c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars and shafting, l.c.l., per lb.....3.25c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c.
Bars, S. A. E. Series, No. 3100.....5.25c.
Strips, base, per lb.....4.75c.

Wire Products

(To jobbers in car lots)

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Galvanized wire No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100 lb..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg.....$2.50 to 2.60
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads.60 and 10 per cent off list
Carriage bolts, ⅝ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes, 50, 10 and 10 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ x 4 in., 50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed squares or hex. nuts, blank.4.75c. to 4.50c. off list
Hot pressed nuts, tapped.....4.75c. to 4.50c. off list
C.p.c. and t. square or hex. nuts, blank.....4c. to 4.25c.
C.p.c. and t. square or hex. nuts, tapped.....4c. to 4.25c.
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅞ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Bolt ends with cold pressed nuts.....50 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller, 50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller, 65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.		Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.25	$4.25	⅞-in.	$13.25	$13.50
5/16-in.	4.90	4.90	1-in.	16.25	16.50
⅜-in.	5.90	6.25	1⅛-in.	22.50	23.00
7/16-in.	7.50	8.50	1¼-in.	34.00	34.00
½-in.	9.75	10.00	1-in.	53.00	55.00

Larger sizes—Prices on application.

Cap and Set Screws

Milled hex. head cap screws.....75, 10 and 5 per cent off list
Milled standard set screws, case hardened, 75, 10 and 5 per cent off list
Milled headless set screws, cut thread, 75, 10 and 5 per cent off list
Upset hex. head cap screws, U. S. S. thread, 80, 10 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread, 80, 10 and 10 per cent off list
Milled studs .....65 and 10 per cent of list

Rivets

Large structural and ship rivets, base, per 100 lb.$2.65 to $2.75
Small rivets .....70 and 10 per cent off list

Track Equipment

Spikes, ⅜ in. and larger base, per 100 lb..... $3.00
Spikes, 5/16 in., 7/16 in. and ½ in., per 100 lb.....$3.25 to 3.50
Spikes, 7/16 in..... 3.25 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.50
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts, ½ in. and ⅝ in., base, per 100 lb.. 4.50 to 5.00
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2½ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn			
1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled			
3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2¼-in. O.D. 12 gage	17	5⅝-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.85c. to 3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.60c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb., 5.10c. to 5.35c.

Galvanized

No. 28 (base), per lb.....4.80c. to 5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$5.65
Old range non-Bessemer, 51½ per cent iron	4.90
Mesabi Bessemer, 55 per cent iron	5.40
Mesabi non-Bessemer, 51½ per cent iron	4.75

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	42c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.75 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	19.00 to 22.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$107.50
Ferromanganese, British, 80 per cent f.o.b. Atlantic port, duty paid	107.50
Ferrosilicon, 50 per cent, delivered	75.00
Ferrosilicon, 75 per cent	140.00
Ferrotungsten, per lb. contained metal	90c. to 93c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent, $36.00 to $37.00
Spiegeleisen, domestic, 16 to 19 per cent, 35.00 to 36.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50; 14 to 16 per cent, (electric furnace) $40.00.
Silvery iron 5 per cent, $29.00; 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	$20.00 to $22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines	22.00 to 23.50

Per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		38.00 to 40.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		47.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	41.00
Sheet bars, open-hearth	41.00
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.25c. to 2.30c.
Skelp, sheared, per lb.	2.25c. to 2.30c.
Skelp, universal, per lb.	2.25c. to 2.30c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails, light, new steel, base, lb.	2c.
Rails, light, rerolled, base, per lb.	1.85c. to 1.90c.
Spikes, ⅜-in. and larger, base, per 100 lb.	$3.00
Spikes, ½-in. and smaller, base, per 100 lb.	$3.25 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rail steel reinforcing, base, per lb.	2.10c. to 2.15c.
Rail steel bars, base, per lb., Chicago mill	2.30c.
Cold finished steel bars, base, Chicago, per lb.	3c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.00 to $3.15

Alloy Steel

S. A. E. Series Numbers	Bars 100 lb.
2100* (½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	5.00
2500 (5% Nickel)	$6.50 to 7.00
3100 (Nickel Chromium)	4.00
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200* (Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silicon Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	4.75
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analysis. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43	*Pacific Coast	$1.15
Philadelphia, export	0.225	Cleveland	0.215	Kansas City	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic	0.31	Cleveland, Youngstown Comb.	0.225	Kansas City (pipe)	0.705	Birmingham	0.53
Baltimore, export	0.225	Detroit	0.19	St. Paul	0.60	Memphis	0.56
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735	Jacksonville, all rail	0.70
New York, export	0.255	Indianapolis	0.29	Omaha	0.705	Jacksonville, rail and water	0.415
Boston, domestic	0.365	Chicago	0.31	*Denver	1.15	New Orleans	0.67
Boston, export	0.255		0.34	†Denver (pipe)	1.17		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

Plans of New Companies

The Crescent Tool & Mfg. Co., 5835 Russel Street, Detroit, has been organized with $50,000 capital, paid in, has purchased the plant and equipment of the Wilton Tool Co. and is now in full operation. The company will specialize in the manufacture of tools and dies.

The Gem Mfg. Co., 403 Stevens Building, Detroit, has been incorporated with $20,000 capital stock to manufacture electric table stoves and other electrical equipment, continuing an established business. Manufacturing will be done by contract, awards for equipment having been let. F. M. Eldrede is manager.

The Laetz Foundry, Bay City, Mich., has been organized to manufacture gray iron, brass and aluminum castings, having taken over the business formerly conducted by the Chris Laetz Foundry. W. S. Cooley is manager and Chris Laetz is superintendent.

The Smith-Heylandt Co., 2633 Fourth Street, Southeast, Minneapolis, has been organized with capital stock of $500,000 to take over patents and distribution of Heylandt apparatus for the manufacture of oxygen and other gases by the liquification process. Liquid oxygen breathing equipment also will be manufactured. Elmer H. Smith, president Commercial Gas Co., heads the new organization. John R. R. Miles will be secretary.

The E. J. Scudder Foundry & Machine Co., Canal and Pearl Streets, Trenton, N. J., has been incorporated with $50,000 capital stock to operate an iron foundry and machine shop. It will build wire machinery, pottery and rubber machinery, and will do general foundry and machine work. The company's plant is now in operation on about a 30 per cent basis, but will be at about 85 per cent within the next few weeks. E. J. Scudder was formerly for 23 years with Duncan MacKenzie's Sons Co., during 14 of which he managed the machine department.

The Safe, Lock & Key Corporation, 204 Pearl Street, Buffalo, has been organized to manufacture special locks in small quantities. It has shop and equipment. George H. Haier is president.

A new organization is being formed for the purpose of purchasing the business now owned and operated by Charles Ahr, manufacturer of drop forgings and machine forgings, 75-79 Schley Street, Newark, N. J.

The Jiffy Wire Connector Co., Hackensack, N. J., has been incorporated with $100,000 capital stock to manufacture a solderless wire connector. Manufacturing will be done by an outside concern, the new company operating an assembling plant. C. Kerkhof is treasurer.

The American Auto Accessories Co., Philadelphia, has been organized to manufacture a quick-change transmission for Ford cars. Manufacturing will be done by contract through a Cincinnati firm. Charles F. Case is secretary.

The Plant-Mills Indicator Corporation, 503 Market Street, San Francisco, has been organized to manufacture indicators and alarms. Manufacturing will be done through the Bethlehem Shipbuilding Corporation. S. Mills is one of the principals.

The Plymouth Tube Co., 1435 Franklin Street, Detroit, has been incorporated with $25,000 capital stock to manufacture seamless steel tubing. It will occupy the plant formerly owned by the Detroit Plumbing Supply Co. Equipment is installed and operations have been started. H. B. VanPelt heads the company.

The Lally Fire Appliance Co., 109 Shipley Street, Wilmington, Del., has been incorporated with $100,000 capital stock to take over the business of the Wilmington Brass Co., manufacturer of chemical tanks, hose couplings, fire extinguishers and specialties in brass work. Operations are under way. John T. Lally is president and James J. English, secretary-treasurer.

The Standard Brake Shoe & Foundry Co., Pine Bluff, Ark., has been incorporated with capital stock of $500,000 to take over a business established in 1916. No change in management is contemplated. F. L. Dilley is president; E. S. Dilley, vice-president and manager; W. J. Roehl, second vice-president, and E. L. Whitelaw, secretary.

The Standard Metal Specialty Co., 945 Farmington Avenue, West Hartford, Conn., recently organized, will manufacture a number of products, but has not decided whether manufacturing will be done by contract or otherwise. L. N. Denniston is president; J. A. Maher, vice-president; H. M. Reed, treasurer, and H. C. Long, manager.

The Watson Stabilator Co. of Connecticut, 135 Canon Street, Bridgeport, Conn., has been organized as distributor of Watson stabilators, manufactured by the John Warren Watson Co., Twenty-fourth and Locust Streets, Philadelphia. In addition the new company will handle Spring oilers and speed-o valve lifters. C. M. Winfield heads the company.

The Daigle Iron Works, 1967 Lafayette Boulevard, Detroit, has been organized with $350,000 capital stock to operate as fabricator of structural steel and to do miscellaneous iron work. The new company will occupy the plant formerly used by Thomas F. Daigle, who becomes president.

The Burton Concrete Products Corporation, Dan Waggoner Building, Fort Worth, Tex., recently incorporated with $70,000 capital stock, will manufacture brick, tile, concrete tanks and building units. It plans to build a plant and will install sand and gravel equipment. Concrete mixers and sewer tile equipment are needed. L. L. Burton heads the company.

The Danko Products Corporation, care of S. S. Kogan, 320 Broadway, New York, has been incorporated with $100,000 capital stock to manufacture a patented mechanical product. Affairs of the company are still in the formative state. S. Sapir and C. Hyman are the incorporators.

Vincent, Inc., New York, has been incorporated with capital stock of $500,000 to manufacture electric lighting equipment. Plans are not ready for announcement. Present address is in care of Frank Hendrick, 25 Broad Street.

The Ferro-Co Corporation, recently incorporated, is a continuation of the Ferro Products Co., which has been in operation since 1916 as a partnership in the manufacture of vats, tanks, bins, chutes, pans, stair risers, treads and various sheet metal products. Operations will be continued at Wythe Avenue and North Thirteenth Street, Brooklyn. Howard Fitzpatrick has sold his interest and his former partner, E. P. Larkin, becomes vice-president and treasurer of the new company. A. D. Mellor, formerly of Mellor & Hamburger, and secretary of the Supro Building Products Corporation, is president.

The B & P Drop Forge Corporation, 145-51 Frelinghuysen Avenue, Newark, N. J., has been incorporated with $125,000 capital stock to manufacture forged pliers and automobile accessories. It has a modern plant to turn out forgings and punchings, although the main product will be a 6-in., drop forged, slip joint plier. J. Alfred Baker is president; E. Douglas Baker, formerly professor of mechanical engineering at the Nova Scotia Technical College, is vice-president, and Z. George Premont, who was with the Starrett Mfg. Co., in an executive capacity for about 15 years, is treasurer. Mr. Premont was also at one time superintendent of Kraeuter & Co., Newark.

The Triamant Corporation, New York, recently incorporated with $200,000 capital stock to manufacture drilling equipment and mining apparatus, is nearing completion on extensive tests which have been conducted by outside concerns, and it is expected that the company will be ready to start manufacturing within a month. Present address is in care of Maj. F. P. Fremont, 97-99 Water Street.

Julius Oehrlein, Inc., 1840 Bathgate Avenue, New York, has been incorporated with $100,000 capital stock to manufacture metal ceilings, metal laths, etc. It is taking over the business of a company formerly engaged in this line. W. J. and Julius Oehrlein are the principals.

The Montauk Metallic Bed Co., 36 Milford Street, Brooklyn, recently incorporated with capital stock of $400,000, will manufacture metal beds, springs, etc., operating as a consolidation of the former Montauk Metallic Bed Co. and S. Weissglass & Co., maker of brass beds. Under the new organization Samuel Greenberg has been elected president.

The C & P Research Corporation, care of McKercher & Link, 40 Rector Street, New York, has been incorporated with $100,000 capital stock to manufacture machinery, but present activities will be confined to research in this field. W. S. Savage, E. D. Hayward and J. B. McNally are the incorporators.

New Office at Tokio

The H. K. Ferguson Co., engineer and contractor, Cleveland, has established a permanent sales designing and construction office in Tokio, Japan. This office will have charge of sales, engineering and construction work in the entire Orient. John Parrish is in charge of the Tokio office and W. H. Thomson has charge of the designing division. The office has been established principally to take care of the demand in Japan for a complete industrial building service. Other representatives of the Ferguson company now in Japan are J. S. Ruble, vice-president, and J. R. Summers, chief engineer. The company has under construction a large electrical machinery plant near Yokohama for a Japanese company and has recently been engaged to check over designs for the reconstruction of the plant of the Western Electric Co. which was partially destroyed by the earthquake.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
April	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
16.....	13.62½	13.25	49.62½	8.00	7.75	6.40	6.05
17.....	13.62½	13.25	49.12½	8.00	7.75	6.40	6.05
19.....	13.62½	13.25	....	8.00	7.62½	6.45	6.10
21.....	13.62½	13.25	49.25	7.90	7.62½	6.45	6.10
22.....	13.75	13.25	49.50	7.90	7.62½	6.47½	6.12½

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, April 22.

Demand has improved but little and the markets are generally inactive. Good Friday was practically a holiday. The tone of the copper market is better with prices a little firmer. The tin market remains practically stationary. The lead market is easier but prices of zinc have advanced slightly.

Copper.—There has been very little improvement in buying but there has been a little more inquiry from both domestic and foreign consumers. A few sales have been made in both directions, but the volume is by no means satisfactory. The general tone of the market may, however, be characterized as firmer with prices a little stronger, due partly to higher quotations in London and to the firmer attitude of sellers. Today there were fewer producers or dealers willing to sell as low as 13.50c., delivered, with some asking 13.62½c. as a minimum. Lake copper most of the week has been quoted at 13.50c. to 13.75c., delivered.

Tin.—The market was moderately active up to Friday, April 18, the total sales for the four days preceding Friday having been about 1200 tons. Most of this business was done between dealers, though consumers have been buying a little more freely. Friday was essentially a holiday and with the London market closed because of the Easter holidays until this morning, trading here has been practically nil. Today there has also been no business with spot Straits tin quoted at 49.50c., New York. There are rumors that the bull group which has been operating against a leading London dealer has either sold out or else is cooperating. It is at least believed that the fight between them is over. Because of some slowing down in general business, reduced activity and hesitation are noticeable but it is the opinion of some keen observers that buying must start fairly soon. Quotations in London today in a quiet but firm market were about £4 per ton higher than a week ago, with spot standard quoted at £247 15s., future standard at £247 15s., and spot Straits at £248 15s. Arrivals thus far this month have been 7115 tons, with 4834 tons reported afloat.

Lead.—This market is very quiet and prices are sagging, though the decline is not rapid. Consumption is apparently as heavy as ever but consumers are not buying. The leading interest continues to maintain its contract price at 8.25c., New York, with quotations in the outside market at 7.62½c., St. Louis, or 7.90c., New York.

Zinc.—Prices for prime Western are a little higher due less to increased buying than to a better general tone and a firmer attitude on the part of sellers. Prices in London also are a little more favorable. There has been some buying on the slight advance which has taken place and sales were made yesterday at 6.10c., St. Louis, with bids at the same level refused today. Quotations for early delivery range today between 6.10c. to 6.15c., St. Louis, or 6.45c. to 6.50c., New York.

Nickel.—Shot and ingot nickel are quoted unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 30c. to 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 28c. to 32c. per lb.

Antimony.—The market is a little easier and Chinese metal in wholesale lots is quoted at 9.75c. to 10c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers at 27c. to 28c. per lb., duty paid, delivered, with uncertainty prevailing as to the quotations of the leading domestic producer.

Old Metals.—Business continues quiet. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	12.00
Copper, light and bottoms	11.00
Heavy machine composition	10.75
Brass, heavy	8.25
Brass, light	6.75
No. 1 red brass or composition turnings	9.50
No. 1 yellow rod brass turnings	8.00
Lead, heavy	6.50
Lead, tea	5.50
Zinc	4.75
Cast aluminum	17.50
Sheet aluminum	18.00

Chicago

April 22.—In a dull market tin and zinc have declined while the other metals remain unchanged. Among the used grades tin scrap has dropped. We quote in carload lots: Lake copper, 14c.; tin, 51.50c.; lead, 8.10c.; spelter, 6.15c.; antimony, 12c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9c.; red brass, 8.50c.; yellow brass, 7c.; lead pipe, 6c.; zinc, 4c.; pewter, No. 1, 27c.; tin foil, 31c.; block tin, 37c.; all buying prices for less than carload lots.

British Pig Iron and Steel in March

LONDON, ENGLAND, April 18 (*By Cable.*)—The pig iron production in March was 668,600 gross tons as compared with 612,700 tons in February and with 631,500 tons in January. This was the largest production since June, 1923, and it compares with an average output per month of 619,800 tons per month in 1923. The output of steel ingots and castings in March was 825,200 tons. This compares with 767,600 tons and 690,100 tons in February and January respectively. It exceeds the monthly average for 1923 of 707,400 tons.

Comparative production figures for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month.....	855,000	639,000
1920, per month.....	669,500	755,600
1921, per month.....	217,600	302,100
1922, per month.....	408,300	486,000
1923, per month.....	619,800	707,400
January, 1924.....	631,500	690,100
February	612,700	767,600
March	668,600	825,200

The totals for the first quarter are 1,912,800 tons of pig iron and 2,282,900 tons of steel.

Analysis of Aluminum and Its Alloys

In connection with its investigations of the metallurgy of aluminum and aluminum alloys, the Bureau of Mines has developed certain methods of chemical analysis for these materials as well as for aluminum ores and other aluminum works materials. The purpose of an investigation now being conducted at the Pittsburgh experiment station of the bureau is to prepare a compendium of methods of analysis and to carry out research work in this field. Methods have been developed for the direct determination of aluminum, and the ordinary methods of analysis for copper, silicon, iron, zinc, nickel, titanium, carbon, nitrogen, and other impurities or additive elements contained either in aluminum or its light alloys have been compared. A bulletin descriptive of the results of the work is in process of writing.

E. Arthur Tutein, Inc., 50 Congress Street, Boston, will remove the New York office of the company, about May 1, from 25 Broad Street to Room 722 at 2 Rector Street.

PERSONAL

John F. Hennessy has been appointed district manager of sales of the Bethlehem Steel Co. at Cincinnati and has taken up the duties of his new position, in which he succeeds J. L. Adams, resigned. Mr. Hennessy has been connected with the steel business for approximately 20 years, since his graduation from Bucknell University. His first employment was with the National Tube Co. as a chemist at McKeesport, Pa., next with the Pennsylvania Steel Co. at Steelton, Pa., in the frog and switch department. After two years he was moved to Chicago, where he was connected with the sales department until the absorption of the company by the Bethlehem Steel Co. in 1916. He continued with the Bethlehem company as assistant sales manager in the Chicago district until his transfer to Cincinnati as district manager.

JOHN F. HENNESSY

S. G. Case, who has been connected with the Phoenix Iron Co., Philadelphia, for the past 24 years, having charge of the sales office at Rochester for the past 14 years, will move to Albany, N. Y., in view of the fact that the States of Connecticut and Vermont, and Massachusetts as far east as Worcester and including that city, have been added to his territory. After May 1 his address will be 715 City Savings Bank Building, Albany, N. Y.

Charles F. Rand, New York, will sail for Europe April 26. He will attend the May meeting of the Iron and Steel Institute in London.

Harry M. Wallis, since 1892 president of the J. I. Case Plow Works Co., Racine, Wis., resigned April 15. In his letter of resignation he said that for three years he devoted practically his entire time without compensation in an effort to bring about a reorganization for the best interests of bankers, stockholders and all others interested, but sincerely regretted that his efforts had been unsuccessful. Mr. Wallis is a son-in-law of the late Jerome I. Case, founder of the Case Company, as well as the J. I. Case Threshing Machine Co., Racine.

J. W. Blackford, for several years connected with the Dale Machinery Co., New York, and later with the Consolidated Machine Tool Corporation, has become attached to the personal staff of Thomas A. Edison, Orange, N. J.

Albert J. Davis, president A. J. Davis & Co., Inc., was reelected president of the Manufacturers and Merchants' Association of St Louis, at the annual meeting on April 17.

Clarence S. Arms, for eight years superintendent of the Palmer works, Palmer, Mass., of the Wickwire-Spencer Steel Corporation, will resign, effective May 1, to become associated with the Wheeldon Wire Co., West Brookfield, Mass. Henry K. Swinscoe, superintendent of production at the Clinton Works of the Wickwire Corporation, also will resign on May 1. He has not made definite plans for the future.

B. L. Sommer, secretary-treasurer Keystone Steel & Wire Co., Peoria, Ill., has been elected president to succeed his brother, P. W. Sommer, recently deceased. B. L. Sommer will continue to hold the office of treasurer, while D P. Sommer, who has been assistant secretary, will act as secretary until a permanent appointment is made.

Francis D. Bowman, Carborundum Co., Niagara Falls, N. Y., delivered an address, illustrated by motion pictures, on the manufacture and uses of abrasives, at the regular monthly meeting of the Chicago Foundrymen's Club at Chicago, April 14.

M. W. Gleisner, formerly superintendent of the Southside Malleable Castings Co., Milwaukee, has been appointed superintendent of the malleable division at plant No. 2 of the Stowell Co., Milwaukee, founder in automobile, railroad and agricultural equipment castings.

Jerome R. George, vice-president Morgan Construction Co., Worcester, Mass., sails for Europe on the Berengaria this week on business of his company. He will visit Great Britain and the Continent and will be gone about two months.

Carl Linden, sales engineer for the Cincinnati Planer Co. and the Acme Machine Tool Co., has been appointed eastern sales manager for these companies, and will locate permanently in New York. He will look after the companies' sales in connection with their regular agents, Henry Prentiss & Co. of New York and the W. E. Shipley Machinery Co., Philadelphia.

Eugene Rich has been added to the staff of the Cincinnati office of the Bourne-Fuller Co, where he will have charge of the engine ring work in connection with the reinforcing bar department.

J. L. Adams, who recently resigned as district manager of sales of the Bethlehem Steel Co. at Cincinnati, has opened an office at 1020 Union Trust Building, Cincinnati, for the sale of iron and steel products. Mr. Adams will represent a number of mills in that territory. His son, Percy H. Adams, now with the Bethlehem Steel Co. as a salesman, will join his father on May 1, the new firm being known as J. L. Adams & Co.

H. S. Tarbert, who was formerly connected with the MacBeth Evans Glass Co., Pittsburgh, has joined the sales force of the International Oxygen Co. at Pittsburgh.

C. M. Stewart, formerly sales agent of the Consolidated Expanded Metal Companies, is now manager of sales of the Pennsylvania Steel Export Co., which recently was appointed exclusive distributor of the Consolidated Metal companies' products.

F. N. Adgate, western sales manager of the Lancaster Steel Products Co., Detroit, subsidiary of the General Motors Corporation since 1919, will leave that position May 1 to join the General Motors Export Corporation at New York. He will travel through South America for the company, making headquarters at Rio de Janeiro and Buenos Aires. W. J. Clucas, recently district manager for the Lancaster company at Buffalo, will succeed Mr. Adgate at Detroit.

H. V. Coes, industrial engineer and manager of the Philadelphia office of Ford, Bacon & Davis, has been elected chairman of the finance committee of the American Society of Mechanical Engineers.

Ambrose Swasey, vice-chairman of the board Warner & Swasey Co., Cleveland, has been awarded the degree of LL.D. by the University of California.

Johannes Kjekstad, of the S. O. S. Welding Corporation, Sixth Avenue, Brooklyn, N. Y., was scheduled to deliver an address on April 24 before the Brooklyn Engineers' Club, on "Modern Welding Practice."

R. W. Schultze has joined the San Francisco sales office of the Youngstown Sheet & Tube Co., Youngstown, Ohio, becoming assistant to James H. Gilhuly, district agent in charge of sales in the lower coast territory. Mr. Schultze was formerly connected with the Western sales office of the Bethlehem Steel Corporation.

W. F. Vosmer, general manager of sales Donner Steel Co., Buffalo, has been made vice-president.

Oswald Fowler, Rogers Brown & Co., New York, has returned from a business trip of three months to England.

George C. Scott, United States Steel Products Co., New York, is on a business tour in China and Japan.

OBITUARY

JOHN WILSON HAMILTON, for 25 years conspicuously identified with the structural steel business, died in Brooklyn, N. Y., on his fifty-fourth birthday, April 16, as the result of a surgical operation, following a period of poor heath. He came from Scotland when 14 years of age and against financial obstacles gave himself an education at Cooper Union, New York. By dint of ability and a winning personality, he became contracting manager for the structural steel business of Milliken Brothers, about 1899. On the failure of that concern, he organized in 1907 with the late H. J. Chambers, the structural steel firm of Hamilton & Chambers, New York, specializing in exporting fabricated steel. The business was incorporated in 1916. Mr. Hamilton was a member of numerous social and engineering bodies, including the Engineers' Club, New York, The American Iron and Steel Institute, the American Society of Civil Engineers and the American Society of Mechanical Engineers. He leaves a widow and a son and daughter.

ALBERT L. SWETT, owner of the A. L. Swett Iron Works, Medina, N. Y., died April 12, in Medina, from the effects of an automobile accident which occurred last September. He was born near Medina in 1850 and after studying at Medina Academy, took a position with the Bignal Co., a Medina foundry. With W. H. Sampson he began the manufacture of hardware specialties in 1873 under the name of Sampson & Swett. In 1889 Mr. Swett became sole owner and the firm name was changed to the A. L. Swett Iron Works. In 1898 he founded the A. L. Swett Electric Light & Power Co., which became the Western New York Utilities Co. in 1916.

JOHN H. LORD, who had been associated with Joseph T. Ryerson & Son, Chicago, for the last 18 years, died on March 30, at Louisville, Ky., aged 54 years.

Scrap Declines at Detroit

DETROIT, April 22.—Reduced production in the automotive industry has caused considerable dropping off in the melt in this district and, with accumulated waste material, very few sales have been recorded. One of the largest producers is offering approximately 5000 tons turnings, borings, regular hydraulic compressed, flashings and miscellaneous scrap for May delivery and this will no doubt bring out some new low levels. Declines of 50c. to $1 per ton have been registered on blast furnace materials during the past two weeks.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$13.75 to $14.50
Shoveling steel	13.75 to 14.50
Borings	10.50 to 11.50
Short turnings	10.50 to 11.50
Long turnings	9.50 to 10.50
No. 1 machinery cast	16.50 to 17.50
Automobile cast	23.00 to 24.00
Hydraulic compressed	13.25 to 14.00
Stove plate	14.00 to 15.00
No. 1 busheling	10.50 to 11.50
Sheet clippings	9.00 to 10.00
Flashings	11.00 to 12.00

Rogers, Brown & Co. to Sell Port Henry Iron

Witherbee, Sherman & Co., Port Henry, N. Y., have appointed Rogers, Brown & Co., New York, sole agents for the sale of its pig iron, according to announcement by Lewis W. Francis, president of Witherbee, Sherman & Co. M. L. Mozier, assistant to Mr. Francis, will continue to direct sales of pig iron for the company. The Boston office, which has been in charge of W. T. Bennett, will be discontinued and on May 1 the New York office of the company at 2 Rector Street will move to offices on the nineteenth floor of 30 Church Street.

GERMAN STEEL PRICES RISING

Bars Increased 7 Per Cent in Three Weeks—Foundry Iron Advanced Same Amount

(By Radiogram)

BERLIN, GERMANY, April 19.—Steel bars are now quoted at 160 gold marks per metric ton (1.73c. per lb.). This compares with 150 marks March 31, equivalent to 1.62c. per lb.

No. 3 foundry pig iron is now held at 94 gold marks per metric ton ($22.75 per gross ton). This compares with 88 marks March 24, or $21.30, and with 110 marks Jan. 24, or $26.60.

1923 Exports and Imports of Germany Less Than 1922 in Most of the Important Iron and Steel Items

BERLIN, GERMANY, March 26.—Complete statistics of iron and steel foreign trade for 1923, as compared with 1922, are now available. In metric tons they are as follows:

	Imports		Exports	
	1923	1922	1923	1922
Ores (including manganese), etc.	2,657,979	12,033,388	445,360	309,189
All iron and steel and wares, except machinery	1,933,260	2,500,417	1,708,969	2,654,677
Thereof:				
Pig iron	300,678	294,311	79,043	157,792
Ferroalloys	12,747	11,782	13,340	14,533
Tubes	7,248	38,578	36,490	49,233
Ingots, blooms, billets, etc.	298,160	325,211	62,076	102,116
Bars, girders, bands	589,640	805,600	197,432	512,313
Sheets	140,471	99,579	167,370	243,174
Wire	108,027	50,765	122,554	173,512
Rails, etc.	198,494	146,695	50,024	324,292
Axles, wheels, etc.	14,466	2,541	18,049	52,064
Boilers and parts	1,706	2,415	16,623	35,196
Agricultural implements	188	1,293	25,940	37,234
Tools, etc.	298	629	30,243	43,047
Screws, rivets, etc.	3,495	7,032	13,293	28,925
Machinery	5,491	10,731	311,117	491,372
Scrap	155,092	600,983	380,887	98,467

The collapse of ore importing, and the heavy decline in machinery exports, the most valuable of all exported metal goods, are the chief features of the table.

Canadian Scrap Market

TORONTO, ONT., April 21.—The market for iron and steel scrap continues weak, with declines in prices in prospect for the early future unless a speedy revival in demand makes its appearance. Melters are buying only from hand to mouth, and despite the fact that the first month of second quarter is practically over, consumers have not shown the interest that scrap dealers contemplated earlier in the year.

Dealers' buying prices are as follows:

	Toronto	Montreal
Gross Tons		
Steel turnings	$11.00	$9.00
Machine shop turnings	10.00	8.00
Wrought pipe	9.00	11.00
Rails	14.00	13.00
No. 1 wrought scrap	12.00	13.00
Heavy melting steel	13.00	13.00
Steel axles	15.00	18.00
Axles, wrought iron	18.00	20.00
Net Tons		
Standard car wheels	15.00	15.00
Malleable scrap	15.00	15.50
Stove plate	15.00	16.00
No. 1 machinery cast	19.00	21.00

"Chemistry Extending Its Frontier" is the title of an 18-page pamphlet issued by Harvard University which deals with the subject under various heads, such as chemistry in history, chemistry in agriculture, chemistry in industry, chemistry and conservation, future developments and chemistry at Harvard.

Machinery Markets and News of the Works

MORE RAILROAD INQUIRY

Norfolk & Western Issues List of 57 Tools—Long Island Wants 12 or 15

Japanese Company Getting Prices on Approximately 1000 Machines for Japanese General Electric Co.

RAILROAD demand today offers the best prospect for machine-tool business. The Norfolk & Western Railroad has issued an inquiry for more than a hundred machines and the Long Island Railroad may buy 12 to 15 tools. If these lists, together with those from the Southern Railway, Santa Fe, New York Central and other roads, which have been pending for some time, were to be bought within the next 30 or 60 days it would afford the machine-tool trade a very satisfactory volume of business. The Chicago, Burlington & Quincy has added several tools to its pending inquiry.

Aside from the railroads, the most active buyers and inquirers are automobile companies, steel companies and electrical equipment manufacturers. Among the automobile companies the Pierce-Arrow Motor Car Co., Buffalo, has been one of the most active buyers. Its purchases of tools are for the manufacture of a light-type automobile. The Ford Motor Co. is an almost continuous buyer despite the reports of curtailment of its output.

An interesting inquiry is in the hands of the Asano Bussan Co., New York, a Japanese exporting house, which is getting prices on about 1000 machines of various types, including forge shop, pattern shop and plate shop equipment, as well as standard machine tools. This list is a duplicate of one sent to this country a year ago. No action was taken at that time, but it is expected that the present inquiry may result in business.

New York

NEW YORK, April 22.

A LIST of approximately 1000 machine tools for the Japanese General Electric Co. is in the hands of the Asano Bussan Co., a Japanese house at 165 Broadway, New York, and quotations are being received from American machinery manufacturers. This list was up about a year ago, but no action was taken. The Asano Bussan Co. believes that buying may result from the present inquiry, though any immediate action of this kind is doubtful because of the Japanese exchange situation, which puts a premium of about 20 per cent on goods bought in the United States. On the list are practically all types of standard machine tools, also machines for forge shops, plate shops and woodworking shops.

Considerable railroad buying in the East appears to be in prospect. In addition to the large list of the Southern Railway, on which action is expected momentarily, the Norfolk & Western has issued a list of upward of 100 machines and the Long Island Railroad is in the market for a dozen or more tools.

The Brooklyn Edison Co. is expected to place orders shortly for 12 or 15 tools which were inquired for early in the year. The machine-tool purchases of the Pierce-Arrow Motor Car Co., Buffalo, for equipping shops to manufacture a new light-type automobile, are not as extensive as expected. Among purchases of the past week were: New York Central Railroad, a locomotive axle journal turning lathe; Westinghouse Electric & Mfg. Co., East Pittsburgh, 5-in. spindle horizontal floor borer; Otis Elevator Co., Cleveland, 36-in. x 19-ft. lathe; Carnegie Steel Co., Pittsburgh, 1500-lb. steam hammer.

The statement made in THE IRON AGE of March 20 that officials of the American-LaFrance Fire Engine Co., Inc., Elmira, N. Y., had organized the Ward LaFrance Truck Corporation as a subsidiary was not correct, as the officials of the American LaFrance Fire Engine Co. had nothing to do with the organization of the Ward LaFrance Truck Corporation, nor is the American-LaFrance Fire Engine Co. in any way interested in the Ward LaFrance Truck Corporation.

The Carborundum Co., Niagara Falls, N. Y., is in the market for a used hydraulic press, with 20- to 26-in. ram, 18-in. stroke, pressure 4500 to 6000 lb. per sq. in. and platens 36 in. square or larger.

The Mill Supply Co., 226 Hill Street, Troy, N. Y., is in the market for generators and electric motors.

The Superintendent of Lighthouses, Staten Island, N. Y., will take bids until April 29, for 300 cylinders for compressed acetylene gas, each 180 cu. ft. capacity, complete with valves, etc.

The Union Machine Co., 719 Sixth Avenue, Brooklyn, plans for the purchase of a universal milling machine and other tools.

Charles & Co., 48 East Forty-third Street, New York, grocer, will begin the erection of a distributing works, and automobile service and repair building for company trucks and cars, on First Avenue, Forty-fourth to Forty-fifth Street, to cost $775,000, with equipment, for which a general contract has been let to the Ruggles-Robinson Co., 311 Madison Avenue.

The Crane Co., 836 South Michigan Avenue, Chicago, manufacturer of pipe and pipe fittings, steam specialties, etc., has purchased property on the Flatbush Avenue Extension, including 35-43 Debevoise Place, Brooklyn, 100 x 100 ft., for a site for a new factory branch and distributing warehouse, to cost about $100,000.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until April 29, for 171,700 ft. of aircraft cable and 121,000 galvanized thimbles for the aircraft works at Baldwin, L. I., schedule 2103. Also, at the same time for the same location, 12,000 washers, schedule 2104; and 5,000 ft. steel tubing, schedule 2108.

Benjamin Catts and George Shaskin, 11 East Forty-fifth Street, New York, has engaged Block & Hess, 18 East Forty-first Street, architects, to prepare plans for a five-story automobile service and repair building, 100 x 100 ft., at 237-43 East Fifty-fifth Street, estimated to cost $200,000, with equipment.

Manual training equipment will be installed in the two-story and basement high school to be erected at Fort Edward, N. Y., estimated to cost $250,000, for which bids will be asked at once on a general contract. Loth & White, 109 State Street, Albany, N. Y., are architects.

The Board of Education, Park Avenue and Fifty-ninth Street, New York, is completing plans for a vocational school for boys at Tinton Avenue and 147th Street, Bronx, to cost in excess of $600,000.

De Rose & Cavalieri, 370 East 149th Street, New York, architects, are preparing plans for a one-story automobile service and repair building, 150 x 210 ft., on East 139th Street, for a company now being organized, estimated to cost $90,000, with equipment.

The Crane Market

PURCHASING of both electric overhead traveling cranes and locomotive cranes has been exceedingly light, but inquiries continue to accumulate. It will probably be some time before award is made of the cranes inquired for by the Foundation Co. for the Southern Railway contract at Knoxville, Tenn. In the New York district contractors are evincing interest in locomotive cranes and there will probably be some purchasing before long. The Latin American Sugar Co., 82 Beaver Street, New York, is receiving bids on a 10-ton hand power crane with two 5-ton trolleys, for export. Another sugar company, the Eastern Cuba Sugar Co., Havana, Cuba, has just closed on a 20-ton, 77-ft. span electric traveling crane with an eastern builder. Several Japanese export companies are reported to be receiving bids on locomotive cranes for Japan and an inquiry is reported in the market from these export houses for coal handling equipment (conveyors) for the Anzin Steel Works in Manchuria. One of the largest domestic inquiries for locomotive cranes that has appeared for some time is that of the Chesapeake & Ohio Railroad, Richmond, Va., for five 25-ton locomotive cranes and four standard ditchers. The list of six 25-ton locomotive cranes asked for several months ago by the Baltimore & Ohio Railroad has been postponed. The Phoenix Utility Co., New York, which has purchased some small cranes recently, is reported to still have one crane pending.

Among recent purchases are:

Atchison, Topeka & Santa Fe Railroad, Chicago, a 25-ton locomotive crane from the American Hoist & Derrick Co.

Standard Oil Co., New York, for Bayonne, N. J., a 30-ton locomotive crane from the American Hoist & Derrick Co.

Western Union Telegraph Co., 195 Broadway, New York, a 20-ton, 60-ft. boom used Industrial locomotive crane for Nashua, N. H., from Philip T. King, New York.

American Laundry Machinery Co., Rochester, N. Y., two 5-ton, 25-ft. and 50-ft. span, 3-motor overhead traveling cranes from the Shepard Electric Crane & Hoist Co.

Pittsburgh Plate Glass Co., Philadelphia, a 2-ton, 16-ft. 6-in. span, 3-motor, single I beam crane from the Shepard Electric Crane & Hoist Co.

Hoover Co., North Canton, Ohio, a 5-ton, 22-ft. span, a 5-ton, 17-ft. 5-in. span and a 5-ton, 40-ft. 11-in. span, 3-motor overhead traveling cranes from the Shepard Electric Crane & Hoist Co.

Humphrey & Sons Co., Joliet, Ill., a 3-ton, 36-ft. 10-in. span, single I beam crane from the Shepard Electric Crane & Hoist Co.

Merkel Bros. Co., Cincinnati, a 5-ton, 93-ft. 7-in. span, 3-motor, double hook magnet crane from the Milwaukee Electric Crane & Mfg. Co. (Pittsburgh office).

Republic Iron & Steel Co., Youngstown, a 15-ton, 30-ft. span overhead traveling crane from the Alliance Machine Co.

The American Locomotive Co., 30 Church Street, New York, plans for the construction of a one-story addition to its plant at Schenectady, N. Y., to cost about $300,000, with equipment.

The Yellow Taxi Corporation, 155 East Forty-fourth Street, New York, has acquired property at 508-16 East Twenty-third Street, extending through to East Twenty-second Street, 125 x 198 ft., and will have plans drawn for a new service and repair works to occupy the entire site, estimated to cost $200,000.

The Board of Trustees, Princeton University, Princeton, N. J., has approved plans for a new steam-operated power house at the institution, using oil fuel, to be located near the Baker Memorial Skating Rink.

Manual training equipment will be installed in the new three-story high school to be erected on Deal Lake, Asbury Park, N. J., for which bonds for $1,000,000, have been approved. Bids on a general contract will be asked at once. Ernest A. Aaron, care of the local Board of Education, is architect.

The Department of Institutions and Agencies, Trenton, N. J., has awarded a general contract to Henry R. Kent, Rutherford, N. J., for the erection of a new steam-operated power house at the state hospital for the insane, Morris Plains, N. J., to cost $224,500.

L. J. Whitford, 10 Journal Square, Jersey City, N. J., is in the market for a tube or ball mill, not more than 15 ft. long, second-hand.

The Torsion Test Piston Ring Corporation, 108 Adams Street, Newark, N. J., manufacturer of piston rings for automotive service, has leased an adjoining building at 114 Adams Street, for extensions, and will occupy at once.

Officials of the Public Service Electric Co., United Electric Co., and the Public Service Gas Co., Public Service Terminal, Newark, N. J., are organizing a new company to be known as the Public Service Electric & Gas Co., to take over and expand the present generating plants and systems of all three companies, consolidating the interests. Thomas N. McCarter will be president.

Buffalo

BUFFALO, April 21.

MACHINE tool dealers report that the past week was not productive of very good business. Dismantling of several plants recently in this vicinity has placed a good many tools on the market to compete against new machinery. The Herschell-Spillman tools are now on the market, including Ingersoll millers, screw machines, engine lathes, grinders, and in fact almost every tool necessary for the production of a gasoline engine. There are 500 in all.

The Erie Railroad will install $25,000 worth of machinery in a new building for repair of car wheels at Hornell, N. Y. The building is to cost $50,000.

The Railway Service & Supply Corporation of America will open a waste reclaiming plant at the Watertown, N. Y., car shops of the New York Central Railroad Company. The new plant will have machinery to reclaim waste and oil used in the journal boxes on cars. B. H. Warren will have charge.

The New York Central Railroad Co., Grand Central Terminal, New York, has acquired the No. 2 bridge plant, a fabricating works, at the Lackawanna plant of the Bethlehem Steel Co., for a consideration stated at $350,000. The new owner will remodel and improve the works, and will equip as a general car repair plant.

Frank X. Schwab, commissioner, department of public safety, Buffalo, will take bids until April 28, for 20,000 ft. of 4-conductor lead sheath cable, with conductors No. 14 B. & S. gage; also, at the same time, for 6,299 ft., 35-conductor lead sheath cable, same size conductors, for the local fire department.

Manual training equipment will be installed in the two-story high school to be erected at Westbury, N. Y., estimated to cost $300,000, for which bids will be asked on a general contract in the near future. Peabody, Wilson & Brown, 140 East Thirty-ninth Street, New York, are architects.

Electric power equipment, elevating and conveying machinery will be installed in the six-story addition to be erected at the plant of the Island Warehouse Corporation, 250 Ganson Street, Buffalo, operating a flour and milling plant, estimated to cost $105,000.

The Binghamton Light, Heat & Power Co., Binghamton, N. Y., is concluding negotiations for the purchase of the plant and property of the Cincinnatus Light & Power Co., Cincinnatus, N. Y., and plans for extensions and improvements in this district, including the installation of additional equipment.

The Buffalo General Electric Co., Electric Building, Buffalo, will soon begin the construction of a power house on Short Street, estimated to cost $80,000.

The Smith & Sons Corporation, Buffalo, manufacturer of japanned wire pins and kindred products, is arranging for the early closing of its branch plant at Lambertville, N. J., and will remove the equipment to its local works, consolidating and increasing operations at this location. The Lambertville plant on North Union Street, 150 x 220 ft., has been purchased by the Lambertville Pottery Co., manufacturer of vitreous sanitary ware, with adjoining works, and will be equipped for an addition. Andrew Foltz is president of the last noted company.

Power equipment, conveying machinery and other mechanical equipment will be installed in the new one-story addition to be erected at the baking plant of the Harmond Bakeries, Inc., 11 Parsells Avenue, Rochester, N. Y., estimated to cost $40,000. Charles Yost, 743 Meigs Street, is architect.

B. V. Butts, City National Bank Building, Utica, N. Y., has an inquiry out for a crosscut saw, complete with table.

The Fulton County Gas & Electric Co., Gloversville N. Y., is concluding arrangements for the purchase of the plant and property of the Great Bear Light & Power Co., East Worcester, N. Y., and plans include the installation of additional equipment.

Manual training equipment will be installed in the two-story high school to be erected at Nunda, N. Y. M. E. Miller, 70 West Chippewa Street, Buffalo, is architect.

The Department of Public Works, Buffalo, plans for the construction of a power house at its proposed garbage incinerating plant at site at Cheektowaga. It is estimated to cost $250,000, with equipment.

The Board of Trustees, Potsdam, N. Y., plans for the installation of electric-operated pumping machinery in connection with extensions in the municpal waterworks. J. P. Wells, Cutler Building, Rochester, N. Y., is engineer.

The Macbeth Body Co., 218 Hurst Building, Buffalo, has been organized with $400,000 capital stock to manufacture a full line of steel dump and hoist bodies, and will be in the market for materials and equipment. F. W. Buse, formerly factory manager of the Grand Rapids Show Case Co., is president.

The Lackawanna Steel Construction Corporation, P. O. Box 951, Buffalo, is inquiring for a 5- to 7½-ton traveling crane with 45- to 75-ft. span, for 220-volt, 25-cycle current.

Philadelphia

PHILADELPHIA, April 22.

THE Supplee-Wills-Jones Co., Twenty-sixth and Jefferson Streets, Philadelphia, operating a series of dairy plants, has awarded a contract to the George Kessler Contracting Co., 1733 North Marvine Street, for extensions and improvements in its machine shop at Merion and Forty-eighth Streets, to cost $32,000.

The Locust Garage Co., Locust Street, Philadelphia, has awarded a general contract to the Rose Construction Co., Inc., North American Building, for a one-story service and machine repair building on Locust Street, near Forty-eighth Street, to cost about $80,000.

The Girard College Estate, Girard and Corinthian Avenues, Philadelphia, has plans under advisement for a two-story addition to the present mechanical school, to cost about $250,000 with equipment. John T. Windrim, Commonwealth Building, is architect.

The depot quartermaster, United States Marine Corps, Philadelphia, will take bids until May 1 for a quantity of tools and mechanical equipment, including 1000 saw files, 8000 hacksaw blades, 100 machinists' hammers, 1000 carpenters' hammers, 300 folding rules, 6 portable forges, 800 combination gas pliers, 100 blow torches, 10,000 lb. barbed wire, etc., as per schedule 441.

The Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, will begin the erection of an automatic power substation at Sixty-fifth and Paschall Streets, to cost about $80,000. Ground will also be broken for a one-story power house at Main and Green Lane Streets, to cost $85,000.

J. Frank Clark, 23 South Sixteenth Street, Philadelphia, architect, has plans in preparation for a one-story automobile service and repair building, 120 x 140 ft., on local site, for a company whose name will be announced later. The shop is estimated to cost $60,000 with equipment.

The Pennsylvania Bronze & Brass Co., Inc., Twenty-second and Master Streets, Philadelphia, has acquired a building at Twenty-second and Harlan Streets, with adjoining property, heretofore held by C. H. Stover, for a consideration stated at $45,000, and will use as a foundry.

The General Motors Service Co., 2029 Market Street, Philadelphia, has leased property at 2218-20 Market Street for extensions in its service and repair departments.

Herman L. Winterer, 943 North Front Street, Philadelphia, machinery dealer, is in the market for a 150-hp. motor, 550 volts, d. c.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until May 6 for 35,000 ft. aircraft cable for the Philadelphia aircraft works, schedule 2101.

The Crane Co., 836 South Michigan Avenue, Chicago, manufacturer of steam specialties, plumbing fixtures, etc., has acquired a controlling interest in the Trenton Potteries Co., North Clinton and Ott Streets, Trenton, N. J., manufacturer of sanitary ware, including majority stock in six affiliated plants devoted to similar production in the same city. An expansion program for increase in plants and equipment will soon be perfected. Present officers of the Trenton company will continue as heretofore, with John A. Campbell as president.

The Tattersall Co., 147 North Warren Street, Trenton, N. J., building materials, has awarded a general contract to J. B. Nicholson, Ltd., 342 Madison Avenue, New York, for the erection of a coal storage and distributing plant at Morrisville, Pa., to cost $100,000 with equipment. The installation will include a capacity for handling and storing 25,000 tons, including elevating and conveying machinery, electric-controlled scales, etc.

The Pottsville Electric Co., Pottsville, Pa., has taken over the electric light and power plant at Williamstown, Pa., and will remodel and modernize the station with the installation of additional equipment.

The Cressona Auto & Wagon Works, Cressona, Pa., has begun the rebuilding of its automobile body and wagon manufacturing plant, destroyed by fire a few weeks ago. The structure will be one story, estimated to cost $45,000 with machinery.

The Pennsylvania Power & Light Co., Allentown, Pa., has acquired the plant of the Worthington Pump & Machinery Co. at Hazleton, Pa., covering an area of 20 acres, used through the war by the Worthington company and since practically abandoned. The new owner will remodel the plant and convert it into a central repair and assembling works for all classes of power station and line equipment. Immediate possession will be taken. The company is operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Pottsville Steam Heating Co., Pottsville, Pa., will make extensions in its central steam plant for considerable increase in capacity. A 155-ft. concrete stack will be built.

The West Vincent Township Power Co. and the East Nantmeal Township Power Co., West Chester, Pa., have been organized by the same interests to install and operate electric power plants and systems in their respective territories. C. A. McClure, Wayne, Pa., is treasurer of both companies.

The Bethlehem Steel Co., Bethlehem, Pa., has work under way on a scrap reclaiming mill at its Steelton, Pa., works to handle the open-hearth slag at the plant. The new structure will be located near the slab mill and will be provided with an electric magnet for separating.

The secretary of property and supplies, Berkey H. Boyd, State of Pennsylvania, Harrisburg, will take bids until May 13 for a quantity of material for the different departments for the year ending May 31, 1925, including engineering and laboratory supplies and equipment, schedule D; hardware supplies, schedule G; and electrical and heating supplies, schedule I.

Manual training equipment will be installed in the proposed high school to be erected at New Castle, Pa., to cost about $250,000, for which a bond issue is being arranged. The Board of Education is in charge.

The Board of Education, Harrisburg, Pa., has approved plans for new buildings for the proposed manual training group at the uptown high school, estimated to cost $800,000 including equipment, for which bids will soon be asked on a general contract.

Agnew, Batteiger & Co., 1642 Widener Building, Philadelphia, are inquiring for a shear knife grinder for grinding flat shear knives 36-in. long.

John McWilliams & Sons, 934-36 West Side Avenue, Jersey City, N. J., are inquiring for two box jib cranes, second-hand, for forging purposes, of 5- to 7-ton capacity and equipped with rigging device; also for a motor-driven lathe with 36- to 42-in. swing and 18- to 21-ft. centers.

Detroit

DETROIT, April 21.

THE Lansing Fuel & Gas Co., Lansing, Mich., plans for the installation of boilers and other power equipment at its plant, estimated to cost $100,000. Work will begin at an early date.

The Crescent Brass & Pin Co., 5766 Trumbull Avenue, Detroit, has plans for a two-story addition on Trumbull Avenue, 40 x 65 ft., to cost $15,000.

The A-B Stove Co., Battle Creek, Mich., has preliminary plans under advisement for a new branch plant on site to be selected in the south, to cost $100,000, with equipment. The company has recently increased its capital from $800,000 to $1,500,000 for expansion.

The Lindholm-Tolonen Co., 903 Guaranty Building, Detroit, recently organized, is reported to be perfecting plans for a local plant for the manufacture of automobile parts and equipment. A. A. Lindholm and M. E. Tolonen are heads.

E. S. Evans & Co., 1703 Dime Bank Building, Detroit, have acquired property at Jackson, Miss., comprising about 20 acres of land for a new plant, consisting of a number of units, for the manufacture of loading equipment and decks, boxes, etc., for automobile shipping, estimated to cost $225,000 with equipment.

The Duplex Printing Press Co., Battle Creek, Mich., has plans in progress for enlargements in its plant, to double approximately the present capacity.

The Detroit Garages, Inc., 320 Ford Building, Detroit, recently organized, has plans for two service, repair and garage buildings, in the vicinity of Woodward Avenue, to cost approximately $250,000. Brown & Derrick, 400 Empire Building, are architects.

Electrical pumping machinery and equipment will be required in connection with a 1,000,000 gal. storage reservoir and new filtration plant to be constructed at Iron Mountain, Mich., for which a bond issue of $190,000 has just been approved. The Board of Water Works Commission is in charge.

Chicago

CHICAGO, April 21.

ACTIVITY in the machine tool market is confined to scattered inquiries and purchases, largely for individual machines. While buying is not on a broad scale, it is possible that the aggregate of business for this month will equal the March record if it does not prove as large as that for February. Dealers find encouragement in the fact that a number of inquiries of long standing are now at the point of being closed. The Inland Steel Co., for instance, has placed tentative orders for a 30-in. engine lathe, a large planer and a vertical boring mill, involving a total outlay of $30,000. The Gary Tube Co. and the Youngstown Sheet & Tube Co. are also expected to take early action on their requirements. Among the railroads, the Chicago, Rock Island & Pacific has purchased a 26-in. turret lathe for its Silvis, Ill., shop. Otherwise developments in the railroad field have been confined to the issuance of additional inquiries. The Santa Fe has entered the market for a 100-in. Niles, or equivalent, double driving-wheel quartering machine with crank pin turning attachment. The Chicago, Burlington & Quincy has put out the list below for one of its shops.

Chicago, Burlington & Quincy List

(All machines to be motor-driven)

One dry grinder with 18 x 3-in. wheel.
One 2½-in. pipe cutting and threading machine.
One 300 or 500-lb. helve hammer.
One 18-in. x 10-ft. engine lathe.
One dry grinder with 12 x 2-in. wheel.
One electric tool post grinder.

The Graff Motor Coach Co., 3201 South Michigan Avenue, Chicago, has begun construction of a three-story factory for the manufacture of automobile bodies, 74 x 144 ft., northeast corner Michigan Avenue and Thirty-seventh Street, to cost $150,000.

John Monighan, 4622-52 Walton Street, Chicago, has awarded a contract for a one-story steel erection shop, 110 x 250 ft., 4632 West Walton Street, to cost $100,000.

The Western Shade Cloth Co., 2100 South Jefferson Street, Chicago, has awarded a contract for a two-story factory, 125 x 400 ft., Jefferson and West Twenty-first Streets, to cost $500,000.

The Wabash Railroad has started construction of a passenger coach shop at Decatur, Ill.

The National Conveying Equipment Corporation, 1134 North Kilbourn Avenue, Chicago, has purchased property on North Harding Avenue, north of Lake Street, as a site for the construction of a one-story factory, to cost $35,000.

The Elgin, Joliet & Eastern Railroad has asked for bids on the construction of a new power house at East Joliet, Ill.

The Rockford Brass Works, Rockford, Ill., will construct a foundry and factory building to cost $70,000.

The Illinois Tool Works, now at 154 West Erie Street, Chicago, has purchased a site for a new plant on the east side of Keeler Avenue, north of Fullerton Avenue. Puckey & Jenkins, 400 North Michigan Avenue, are drawing plans for the building which will be a one-story structure to contain from 50,000 to 70,000 sq. ft. of floor space and to cost approximately $200,000.

The Nye Tool & Machine Works, 108 North Jefferson Street, Chicago, has purchased 69,000 sq. ft. adjacent to the plant of Lyon & Healy on Fullerton Avenue, near Keeler Avenue, and will erect a factory containing 35,000 sq. ft., to cost $120,000.

The Central Welding Co., North Turner Street and Howard Avenue, Lansing Mich., is constructing a one-story plant, 40 x 100 ft., which will be completed within 60 days. The company does oxyacetylene welding.

Charles T. Rieder, Petoskey, Mich., plans to erect an iron and brass foundry, 30 x 48 ft., on Buckley Avenue in that city. Equipment has been purchased.

Manual training equipment will be installed in the three-story junior high school, to be constructed at St. Paul, Minn., estimated to cost $500,000. F. X. Tewes, City Hall, is architect.

The Electric Storage Battery Co., 146 South Dearborn Street, Chicago, is asking bids on a general contract for a new one- and two-story plant at 4613 South Western Avenue, 180 x 335 ft., estimated to cost $100,000, with equipment. D. H. Burnham, 105 West Monroe Street, is architect and engineer.

The City Council, Marshalltown, Iowa, plans for the installation of electric-operated pumping equipment in connection with extensions and improvements in the municipal waterworks, to cost $300,000. A. T. Luce, superintendent, Water Department.

E. J. Morgan, Sycamore, Ill., is in the market for a steam-driven air compressor, capacity of 300 cu ft. at 125 lb.

The Chambers, Bering & Quinlin Co., 700 East Jasper Street, Decatur, Ill., is asking bids on a general contract for the construction of a one-story foundry, 43 x 200 ft., to cost about $27,000. Brooks, Bramhall & Dague, National Bank of Decatur Building, are architects.

The C. A. Dunham Co., 343 South Dearborn Street, Chicago, manufacturer of heating equipment and systems, is asking bids on a general contract for the proposed addition to its plant at Marshalltown, Iowa, two-story, 50 x 125 ft., to cost approximately $75,000. C. A. Dunham is president.

The Common Council, Oquawka, Ill., plans for the installation of electric-operated pumping equipment in connection with waterworks extensions, estimated to cost $25,000. The Caldwell Engineering Co., Ayres Building, Jacksonville, Ill., is engineer.

New England

BOSTON, April 22.

WITH many shops throughout New England operating only two, three or four days a week, and the improvement in the textile machinery and cotton textile industries not sufficiently broad to warrant expenditures for new equipment, there has been little activity in the machine-tool market. Local machine tool houses were closed from Friday night, April 18, to Monday morning, April 21, there being a local holiday Saturday. Sales reported by Boston dealers for the week can almost be counted on the fingers of two hands, and with one exception they were small, mostly used machines. The exception was a 30-in. Flather lathe, purchased by a Worcester, Mass., shop. Valve grinders, costing several hundred dollars each, are in slightly better demand. Small tool sales continue satisfactory, although here too a falling off in business is evident. No developments were reported in the crane market the past week.

The Chapman Valve Mfg. Co., Indian Orchard, Springfield, Mass., plans extensive alterations to mills Nos. 6, 7 and 8. Smith & Annable Co., Inc., are the architects.

The Danvers Bleachery, Peabody, Mass., has awarded a contract for the erection of a two-story machine shop, 52 x 153 ft. Smith & Walker, 80 Boylston Street, Boston, are the architects.

Bids close Friday, April 25, on a one-story, 75 x 100 ft. service station for the International Harvester Co. of America, 43 Somerville Avenue, Somerville, Mass.

Work has been started on extensive alterations to its Concord Avenue plant unit by the Penn Metal Co., 67 Franklin Street, Boston.

New Bedford, Mass., contemplates a sizable addition to its Fire Department repair shop.

The Norfolk Japanneries, Inc., Canton, Mass., through John O. De Wolfe, 45 Bromfield Street, Boston, engineer, will shortly award a contract for the erection of four one-story, 150 x 60 ft., manufacturing units and a one-story, 30 x 40 ft., power plant.

Plans will be ready June 1 for plant extensions by the American Abrasive Co., Union Street., Westfield, Mass., to consist of one one-story, 50 x 190 ft., manufacturing unit, one three-story, 40 x 90 ft., and one two-story, 50 x 60 ft., manufacturing units, as well as a one-story, 40 x 120 ft., warehouse. M. B. Harding, 97 Elm Street, Westfield, is the architect.

The Columbus Electric & Power Co., Columbus, Ga., R. M. Harding, general manager, has engaged Stone & Webster, Inc., Boston, to prepare plans and specifications for its proposed hydroelectric development at Bartletts Ferry, Ga. The cost will approximate $5,000,000.

The Davox Products Co., South Paris, Me., recently organized to manufacture automobile accessories, plans to build a two-story plant and to install equipment. Plans are also under way for the erection of a concrete building in Ohio within a few months. C. Fox is president.

Manual training equipment will be installed in connection with the erection of the community buildings at Knight and Tell Streets, Providence, R. I., by the Rhode Island Baptist State Convention.

Contract for the construction of a one-story addition, 60 x 120 ft., to the plant of the Collyer Insulated Wire Co., Pawtucket, R. I., has been awarded to the Rowley Construction Co., that city.

A three-story factory addition will be built by the Stanley Rule & Level Co., New Britain, Conn. Plans call for a brick structure, 60 x 89 ft., with slag roof, to cost $45,000.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until May 6, for 6 motors complete with controllers and spare parts, for the Boston navy yard, schedule 2096; also, until April 29, for 330 globe valves and 30 angle valves for the Portsmouth, N. H., navy yard, schedule 2094.

Gleason E. Taylor and Raymond C. Fickett, Casco, Me., have perfected plans for a local plant for the manufacture of bobbins and kindred textile machine equipment. Operations will soon begin.

The Town Council, West Newbury, Mass., is considering the construction of a municipal electric light and power plant to cost about $25,000. John D. King is chairman of the special committee in charge.

The Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has plans for a one-story addition, 60 x 100 ft., on Bank Street, to be equipped in part for a charging department. Fred A. Webster, 51 West Main Street, is architect.

Plans are in progress for the proposed assembling plant of the Ford Motor Co., Highland Park, Detroit, at Cambridge, Mass., and bids will soon be asked. It will be one story, 300 x 1000 ft., estimated to cost $500,000. Albert Kahn, Marquette Building, Detroit, is architect.

The Crane Co., South Avenue, Bridgeport, Conn., manufacturer of valves, steam specialties, etc., has awarded a general contract to the Hewlett Co., Bridgeport, for a two-story addition to its local plant, 25 x 130 ft., adjoining present building E-2. Headquarters of the company are at 836 South Michigan Avenue, Chicago.

The Three-Level Garage Co., 39 Lincoln Street, Boston, H. G. MacDougall, head, is considering the erection of a new service, repair and garage building at Harrison and Chestnut Streets, Springfield, Mass., estimated to cost $160,000 with equipment.

G. E. Hill, Keene, N. H., operating a machine shop, plans for the installation of a number of tools, including engine lathe, planer, etc.

Cleveland

CLEVELAND, April 21.

THE machine tool market continues to drag with few sales aside from single machines. A fair amount of new inquiry is pending but prospective purchasers are holding off because of the present somewhat unsettled business situation. No new railroad inquiries are pending in this territory, but some of the trade have received the list of the Norfolk & Western Railroad. New inquiry has come from a Detroit automobile manufacturer for ten tools, including drills, milling and boring machines. Outside of the buying by the Ford Motor Co. this is the first inquiry of any size that has come from the automotive industry for some time. Manufacturers of the automatic screw machines report a fair volume of small orders and a number of inquiries for lots of three or four tools. This demand is larger from the east. The crane market continues dull.

A manual training department will be established in a $50,000 high school to be erected in Sugar Creek Township, Wayne County, Ohio. E. F. Scott, Dalton, Ohio, is the clerk of the board of education.

The Junior Order of American Mechanics has taken bids for the building of a manual training department to be erected at Tiffin, Ohio.

The Canton Bridge Co., Canton, Ohio, plans the erection of a one-story addition at an estimated cost of $40,000.

The East Shore Machine Products Co., 835 East 140th Street, Cleveland, will erect a factory addition. The Grieble Co., 421 Sloan Building, is the architect.

The Lutheran Orphanage, 2411 Seaman Street, Toledo, Ohio, has awarded a general contract for a power plant. Bates & Gamble, Close Building, Toledo, are the architects.

Motor driven lathe, drill press, cylinder reboring and other machinery and equipment will be installed in a one-story garage and service station now under construction for Cyrus Wise, Sixth Street S. W., Canton, Ohio.

Cincinnati

CINCINNATI, April 21.

THE week was devoid of features in the machine tool industry. A fair number of orders was booked, chief among which was a number of tools bought by the Southern Railway against its recent list. It is understood that part of the list has not been closed. The Norfolk & Western Railroad is in the market for 58 items, representing 113 tools and other equipment, bids on which close at Roanoke, Va., April 30. This is the largest list sent out for some time. The Chesapeake & Ohio Railroad is in the market for a few small tools, and is expected to issue a large list shortly. The Baltimore & Ohio is also in the market for a couple of machines. Several export inquiries are current from France and South America. Used machinery dealers report business as fair.

The Norfolk & Western Railroad list is as follows:

One 2½-in. 3-head threading machine with complete dies.

Two 2½-in. double-head bolt threading machines with dies.

Two 100-in. heavy duty vertical boring mills.
Two 42-in. heavy duty vertical boring mills.
One 48-in. car wheel borer.
One heavy duty horizontal boring, drilling and milling machine.
One locomotive rod-boring machine.
One portable cylinder-bar boring machine.
One portable crank-pin turning machine.
One dome facing machine.
Two 60-in. heavy-duty plain radial drilling machines.
Three 48-in. heavy-duty plain radial drilling machines.
One 2-spindle high-speed drilling machine.
Four 36-in. vertical drill presses.
Two 14-in. sensitive drilling machines.
Two universal cutter and reamer grinders.
Eleven 18x3-in. double floor grinders.
One 12½x1½-in. double floor grinder.
Six 2-ton electric hoists.
One heavy duty key-seating, drilling and milling machine.
Four 20-in. x 5-ft. heavy-duty engine lathes.
Two 16-in. x 4-ft. heavy-duty engine lathes.
Two 25-in. x 6-ft. heavy duty engine lathes.
Three 20-in. universal turret head brass lathes.
Two 36-in. x 8-ft. heavy-duty engine lathes.
One 48-in. x 10-ft. heavy-duty engine lathe.
One 52-in. x 10-ft. heavy-duty engine lathe.
Three double-head car axle lathes.
One 60-in. driving wheel lathe.
One 24-in. vertical turret lathe.
Two 54-in. vertical turret lathes.
One 28-in. horizontal turret lathe.
One 54-in. vertical milling machine.
One 32 x 32 x 32-in. crank planer.
One 36-in. x 36-in. x 16-ft. planer.
One 60-in. x 60-in. x 16-ft. planer.
One 24-in. hand planer and jointer.
Three 36-in. x 36-in. 50-ton power forcing presses.
Two 48-in. 600-ton single end hydraulic locomotive driving wheel presses.
One 48-in. double end punch and shear.
One 36-in. throat, 20-in. gap riveting machine.
Three fuel oil forges.
One 36-in. universal cold cut-off saw.
Two 12 x 12-in. power hack saws.
Three 40-in. rip saws.
One 36-in. band saw.
One 36-in. draw-cut shaper.
Four 36-in. crank shapers.
Two 15-in. Dill slotters.
One 7 x 84-in. Ryerson spring forming machine.
One 52-in. gap shear.
Two electric battery or gasoline crane trucks.
One gasoline truck tractor.
One portable valve facing machine.
One 1-in. to 4-in. pipe threading machine.
Three ⅜-in. to 2-in pipe threading machines.
All the machines above are to be motor driven.

The American Flexible Wheel Corporation, Cincinnati, has been incorporated to manufacture a patented wheel for automobile trucks. The organization of the company has not been fully completed, but present plans are for the erection of a plant in Cincinnati. Gerson J. Brown, and Edgar S. Freiberg, Cincinnati, are the principals.

The Springfield Light, Heat & Power Co., Springfield, Ohio., has taken out a building permit for an addition to its power plant, to cost $20,000. The addition will be used to accommodate a number of extra boilers.

The Interstate Public Service Co., Indianapolis, will shortly begin the erection of a high-tension power transmission line from Jeffersonville, Ind., to Sellersburg, Ind. Steel transmission towers will be erected for a distance of 40 miles.

The Casparis-Ohio Stone Co., Columbus, Ohio., has purchased the property of the Wilmington Crushed Stone Co., Melvin, Ohio., and will spend approximately $50,000 in enlarging the plant and adding new equipment to increase the output.

The Columbus Railway, Power & Light Co., Columbus, Ohio, is disposing of a bond issue of $2,250,000, a portion of the proceeds to be used for extensions and improvements in power plant and system.

The Edward Lampe Construction Co., Toledo, Ohio, has acquired waterfront property totaling 200 ft. on the Black River at Lorain, Ohio, and plans for the installation of a sand and gravel plant, with elevating, conveying and other machinery, estimated to cost $200,000 with equipment. Edward Lampe heads the company.

The Reo-Spalding-Kelley Co., 210 East Broadway, Louisville, has preliminary plans for a two-story automobile service and repair building for the Reo automobile, 60 x 200 ft., to cost about $150,000 with equipment.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has engaged Joseph & Joseph, Francis Building, Louisville, architects, to prepare plans for a one-story and basement addition to its local plant at Sixth and Shipp Streets, 135 x 180 ft., to be equipped as a foundry, estimated to cost $150,000 with machinery.

The Knoxville Power & Light Co., Knoxville, Tenn., is arranging an appropriation of $500,000 for extensions and improvements in its plant and system during the present year, including additions to car shops and repair department.

The Common Council, Paintsville, Ky., is considering the installation of electric-operated pumping machinery in connection with proposed extensions in the local waterworks to cost about $65,000.

The Summers-Herrman Co., 905 Third Street, Louisville, will begin the erection of a three-story automobile service and repair building at Third and Breckenridge Streets, 92 x 100 ft., estimated to cost $165,000 with equipment.

Manual training and vocational departments will be installed in a new school to be erected at Greenville, Ky. estimated to cost $150,000 for which general contract has been awarded to J. Cole, Paducah, Ky.

Gulf States

BIRMINGHAM, April 21.

PLANS are being arranged by the Hollywood Electric Light & Power Co., Hollywood, Fla., for enlargements in its power plant, to include the installation of a 750-hp. Diesel engine and auxiliary machinery. C. B. Moody is superintendent.

The Southwestern Bell Telephone Co., Dallas, Tex., has plans for a two-story mechanical repair and storage building at Horton Street and the line of the Santa Fe Railroad, 100 x 150 ft., with one-story automobile service and repair building, 105 x 110 ft., for company motor trucks and cars, estimated to cost $160,000 with equipment.

The Dixie Metal Products Co., 1016 Twenty-eighth Street, Birmingham, Ala., is perfecting plans for a one-story plant on local site, 50 x 125 ft., to cost about $30,000. Equipment will be purchased at an early date. D. D. Bentley is manager.

C. L. Brady, P. O. Box 1140, Fort Lauderdale, Fla., has inquiries out for machinery for two dipper dredges, one 2½-yd. and the other 1-yd. capacity.

The United States Engineer Office, Mobile, Ala., will take bids until April 28 for one upright tubular boiler, two steam capstans, one swinging engine, one hoisting engine, and one level platform, circular 1644; also, at the same time, for one duplex steam pump, circular 1645.

The Dallas Wire Works, manufacturers of wire products, Dallas, Tex., are in the market for a small electro-galvanizing plant.

The Southwestern Power & Light Co., Fort Worth, Tex., has issued preferred stock for $1,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. F. G. Sykes is president.

The Alabama Water Co., American Trust Building, Birmingham, Ala., is planning for the installation of electric-operated pumping machinery in connection with extensions in its system and plant at Bessemer, Ala., estimated to cost $170,000.

The Harris County Board of Education, Houston, Tex., plans for the installation of a manual training department in the proposed two-story boys' school to be erected at Clear Lake, estimated to cost $110,000. Jones & Tabor, Houston, are architects.

The Hardwicke-Etter Hardware Co., Sherman, Tex., is completing a new one-story works, 55 x 100 ft., at Pecan and Montgomery Streets, to be used for the manufacture of cotton ginning machinery and parts. This is a new department of the business of the company.

The New Orleans Public Belt Railway, Municipal Building, New Orleans, La., has plans for the construction of new local repair shops and roundhouse, estimated to cost $200,000. Frank H. Joubert is general manager.

Pittsburgh

PITTSBURGH, April 21.

MACHINE tool business does not improve much. Orders for single tools are coming out fairly steady, but action against lists, of which there are several of good size before the trade, still is deferred. The recession in steel business is blamed for the failure of steel company plans to reach the closing stage more promptly. There is little doubt that the tools inquired for by the Carnegie Steel Co., for Homestead, the National Tube Co., for Gary, Ind., the Youngstown Sheet & Tube Co., for Indiana Harbor, Ind., and the Westinghouse Electric & Mfg. Co., for Sharon Pa., will be placed, but nobody will venture a guess as to when. Letdown in general business has been followed by retrenchment in expenditures by the railroads. Crane orders are few, with competition very keen. In rolling mill equipment, the feature has been the placing of the new 14-in. bar mill of the Jones & Laughlin Steel Corporation at Woodlawn, Pa., with the United Engineering & Foundry Co., Pittsburgh, which has been awarded the contract for the complete mill, including gears, shears, remount and transfer tables. The Carnegie Steel Co. has ordered a 15,000 kw. turbo alternator unit for its Homestead power plant from the Westinghouse Electric & Mfg. Co.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has awarded a general contract to the Dinwiddie Construction Co., San Francisco, for the erection of an addition to its plant at Emeryville, Cal., comprising the second unit on a 12-acre site, estimated to cost $500,000 with equipment. Work will begin at once. The company has arranged for an increase in capital from $125,000,000 to $200,000,000, a portion of the fund to be used for expansion in plants.

The United States Engineer Office, Pittsburgh, will take bids until April 25 for four hydraulic turbines, as per circular 275, on file.

The Ridgeway-Buick Co., Ridgeway, Pa., local representative for the Buick automobile, is considering plans for a new service and repair building at St. Marys, Pa., to cost about $40,000 with equipment. John Lundquist is manager.

The Coe Pocahontas Coal Co., McComas, W. Va., has tentative plans for the installation of additional equipment at its plant for larger capacity. It is proposed to increase the capital from $200,000 to $300,000. Richard M. McQuail is secretary.

The Pennsylvania Electric Corporation, Johnstown, Pa., has preliminary plans for the construction of a hydroelectric power dam and generating plant on the Deep Creek, a branch of the Youghiogheny River, Garret County, Maryland, to cost more than $3,500,000. The company has recently disposed of a bond issue of $5,000,000, a portion of the proceeds to be used for this and other expansion. F. T. Hepburn is president.

The Sprout-Waldron Co., Sherman and Logan Streets, Muncy, Pa., manufacturer of machinery and parts, has inquiries out for a cutting machine to handle angle iron and 3 x 3 x ¼-in. stock.

Milwaukee

MILWAUKEE, April 21.

SLACKENING of machine-tool demand was more pronounced during the past week. At the same time the surface indications of greater industrial activity were more impressive, especially with respect to the establishment of new shops. Public utilities in Wisconsin are heavy buyers of equipment and materials of all kinds. It was announced at the annual convention of the Wisconsin Public Utilities Association here that the aggregate of 1924 building and expansion programs is $26,769,179, not including an estimate of $3,000,000 required to repair damage by severe storms in March and April. Employment reports show a decline for the first time in months, due largely to the letdown in the automotive industries.

The Burgess Building Co., Madison, Wis., owned by the Burgess Battery Co. and Burgess Mechanical Laboratories, Inc., dry cell battery manufacturers, is undertaking a general plant enlargement program involving about $200,000, including new equipment. C. F. Burgess is president and general manager.

The Hydro-Electric Mfg. Co., Milwaukee, is a new $300,000 corporation organized by W. A. Engelhardt, H. A. Zoidens and Dr. G. H. Kriz, 540 Twelfth Street, to manufacture specialized machinery and equipment for hydro-electric generating plants.

The Husky Wrench Co., Milwaukee, has been incorporated with $50,000 capital stock by Joseph O. Wirtish, formerly manager of the Snap-On Wrench Co., Milwaukee, to engege in the manufacture of a line of mechanics' tools, auto kits, and metal specialties. Oscar W. Engerson and Siegmund Mandle, who likewise were connected with the Snap-On Company, are associated with Mr. Wirtish. A plant is now being equipped. Temporary offices are at 1013 Lincoln Avenue.

The Quality Aluminum Casting Co., Waukesha, Wis., which was established about eight months ago, will enlarge its plant by the erection of a one-story brick and steel addition, 40 x 100 ft. The investment will be about $30,000, including additional equipment. A. C. Pankratz is president and general manager.

The Board of Education, Jefferson, Wis., has engaged Van Ryn & DeGelleke, architects, 114 Grand Avenue, Milwaukee, to design a new high school, estimated to cost about $200,000. Extensive manual training shops will be embraced by the plans. Earl C. MacInnes is city superintendent of schools, and George J. Kispert is president of the board.

The Krause-Dietz Motor Co., 2910 North Avenue, Milwaukee, will build a service and repair shop addition, 60 x 75 ft., one story, at the rear of its present sales and service building. Inquiry is being made for miscellaneous equipment. An investment of $20,000 is contemplated.

The West Mfg. Co., Milwaukee, occupying leased factory space at 90-92 Second Street, has placed contracts for the construction of a new plant, 44 x 100 ft., two stories and part basement, at Hartland, Wis. W. G. Memmler, 228 Third Street, Milwaukee, is architect and engineer. The concern manufactures mechanical specialties, principally a circular sealing device. M. J. West is president and general manager.

The Aluminum Specialty Co., Manitowoc, Wis., manufacturer of drawn ware, utensils and novelties, will enlarge its branch factory at Chilton, Wis., at a cost of $25,000 to $30,000. Plans are being completed by Smith, Reynolds & Brandt, architects, Manitowoc. C. W. Krug is factory manager at Chilton. Walter Spindler is president.

The Water and Light Commission, Tomah, Wis., is asking figures until April 28 for one 300 gal. per min. centrifugal pump, motor and engine driven, one meter and connections, and an 80,000-gal. steel tank mounted on a 100-ft. steel tower, as equipment for a new deep well. W. G. Kirchhoffer, Madison, Wis., is consulting engineer. F. O. Frow is secretary of the commission.

The Kohler Co., Kohler, Wis., manufacturer of enameled sanitary ware, self-contained electro-generating plants, etc., has plans by Brust & Philipp, architects, 405 Broadway, Milwaukee, for a four-story building, 64 x 209 ft., to be used as an administration building, laboratory and experimental plant. The cost is estimated at $250,000. Walter J. Kohler is president and general manager.

The Milwaukee Board of School Directors, Frank M. Harbach, business manager, is asking bids until May 1 for a boiler room addition and equipment for the Twelfth Street School, at Louis Avenue, and for fuel and ash handling equipment for the Trowbridge Avenue School, at Delaware Avenue.

F. M. Hasbrouck, 529 Main Street, Oshkosh, Wis., manufacturer of galvanized metal products, tinware, etc., plans to erect a new shop costing about $15,000 on the adjacent site at 525-527 Main Street, having disposed of the present building.

The Wisconsin Metal Products Co., Racine, Wis., has awarded the general contract to Bondgard & Christensen, 1135 Mound Street, local, for erecting its new manufacturing plant, 100 x 246 ft., one story and basement, on DeKoven Avenue. Plans are by Edmund B. Funston & Co., local architects. A large list of equipment for the production of metal specialties, tools, dies, jigs, fixtures and hardware is being inquired for.

The Buick Garage & Sales Co., Broad Street, Beloit, Wis., is in the market for a full complement of new shop and service equipment for the replacement of the machinery of its service department gutted by fire on April 5. H. P. Sheer is manager.

The Mukwonago, Wis., Village Board of Trustees is taking bids for furnishing the equipment for two new deep wells for the municipal water works system, including air-lifts, compressors and centrifugal pumps and motors. E. A. Austin is village clerk.

The B. F. & H. L. Sweet Co., Fond du Lac, Wis., manufacturer of wagons and carriages, is doing some retooling for the purpose of engaging in the quantity production of a line of trailers, principally a special design for use with Ford trucks and Fordson tractors on farms.

St. Louis

ST. LOUIS, April 21.

THE Mechanics Iron Works, 901 South Ewing Avenue, St. Louis, will begin the construction of a one and two-story plant on Edmunds Street, estimated to cost $45,000.

A. C. Stanhope, Security Building, St. Louis, is in the market for two 75-hp. Fairbanks-Morse type Y oil engines or one 150-hp. oil engine and 2300-volt alternator.

Manual training equipment will be installed in the proposed high school to be erected at Jefferson City, Mo., estimated to cost $300,000, for which a special election to vote bonds has been called. The Board of Education, W. T. Carrington, secretary, is in charge.

The second floor of the new garage and service building, 140 x 156 ft., to be erected by the Board of Works, St. Louis, for the police department, on site on Laclede Avenue, will be equipped as a machine and repair shop, with tool room and parts department. It will cost approximately $150,000. H. C. Clymer, Wainwright Building, St. Louis, is architect.

The Kansas City Power & Light Co., Kansas City, Mo., will begin the construction of a one-story automatic power substation, 61 x 105 ft., at Sixth and Penn Streets, to cost $50,000.

The Common Council, Stillwater, Okla., plans for the installation of electric-operated pumping equipment in connection with a new waterworks estimated to cost $250,000. A bond issue is being arranged. V. V. Long & Co., Oklahoma City, Okla., are engineers.

The City Council, Cheyenne, Okla., plans for the installation of electric-operated pumping equipment at the proposed municipal waterworks, estimated to cost $35,000.

The Lambert-Graves Motor Co., St. Louis, will soon begin the erection of a two-story service and repair building on Lindell Avenue, 75 x 125 ft., to cost about $120,000 with equipment.

The East St. Louis Castings Co., East St. Louis, Ill., has awarded a contract to the Bekley Brothers Construction Co., State Street, for a one-story addition, estimated to cost $38,000, including equipment.

The San Antonio Public Service Co., San Antonio, Tex., has acquired 30 acres on the Guadalupe River, near New Braunfels, Tex., and has preliminary plans under way for the construction of a $5,000,000 power system, to develop about 50,000 hp. The plant will be erected unit by unit, as conditions warrant. New boilers and equipment will also be purchased at an early date for the company's present plant, San Antonio River, Conception Road. W. B. Tuttle is president.

The Rule Jayton Cotton Oil Co., Stamford, Tex., is in the market for a second-hand Corliss engine, 17 x 34 x 48 in., cross compound condensing.

The Viking Pump Co., 309 East Fourth Street, Cedar Falls, Iowa, has awarded a general contract to the G. A. Pepin Co., Janesville, Iowa, for its proposed two-story addition, 66 x 135 ft., estimated to cost $45,000.

The Common Council, Grand Forks, N. D., has authorized plans for a municipal electric light and power plant, for which bonds for $110,000 have recently been voted. Charles E. Evanson is city clerk.

Indiana

INDIANAPOLIS, April 22.

THE Cleveland, Cincinnati, Chicago & St. Louis Railroad Co., Cincinnati, is having plans drawn for a new battery department at its shops at Beech Grove, Ind., estimated to cost $32,000. C. A. Paquette is company architect. Bids will soon be asked.

The Northern Indiana Gas & Electric Co., Fort Wayne, Ind., has secured permission to issue bonds for $3,417,000, practically the entire proceeds to be used for extensions and improvements in plants.

Manual training equipment will be installed in the two-story junior high school to be erected at Marion, Ind., estimated to cost $200,000. Hiram Elder, Custer Building, is architect.

William Weidner, Indianapolis, has begun the erection of a new one-story plant at 1424 East Sixteenth Street, to be equipped for the manufacture of wagons and parts, and for general repair work.

Manual training equipment will be installed in the new one-story high and grade school, to be constructed at Wyatt, Ind., estimated to cost about $110,000, for which plans are being prepared by Freyermuth & Maurer, Associates Building, South Bend, Ind., architects.

Alfred Turley, English, Ind., manufacturer of hubs, rims, etc., plans for the rebuilding of the portion of his plant, destroyed by fire April 9, with loss estimated at $20,000, including equipment.

The Indiana Hydro-Electric Power Co., Norway, Ind., with power plant near Monticello, Ind., has obtained permission to issue bonds for $247,000, a portion of the proceeds to be used for extensions and improvements.

The Interstate Power Co., Inc., Indianapolis, recently organized as a subsidiary of the Interstate Public Service Co., is having plans drawn for the construction of a new steam-operated electric generating plant at Jeffersonville, Ind., to cost approximately $350,000. Harry Reid is president.

The Ford Motor Co., 1315 East Washington Street, Indianapolis, has awarded a general contract to the John R. Curry Construction Co., Lombard Building, for a one-story service and repair building, 100 x 136 ft.

The Indiana Electric Utilities Co., Angola, Ind., has secured permission to acquire the plants and property of the Indiana Utilities Co. and the Economy Electric Co., operating in northern Indiana. Bonds and stock for $347,000 will be issued, a portion of the proceeds to be used for extensions and improvements.

South Atlantic States

BALTIMORE, April 21.

NEGOTIATIONS are said to be under way by the Packard Motor Co., Detroit, for the purchase of a tract of land in the vicinity of Port Deposit, Md., for a new branch plant for assembling and other service.

The Board of District Commissioners, Washington, will take bids until May 1 for sheet metal equipment for the Shaw junior high school, as per lists on file.

The Carolina Canning Co., Aberdeen, N. C., has inquiries out for a stationary engine, steam or oil operated, for installation at its plant.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is disposing of a preferred stock issue of $2,000,000, out of a total authorized of $4,000,000, practically the entire proceeds to be used for extensions in power plants and system. Herbert A. Wagner is president.

The Department of Public Works, Bureau of Water, Room 796, City Hall, Baltimore, is asking bids until May 6 for a quantity of mechanical equipment, including safety devices for pumping stations, contract No. 670; duplex strainers, contract No. 671; auxiliary heating coils, contract No. 672; sand washing machines, contract No. 674; engine cylinders, contract No. 675; water meter parts, contract No. 677; stop valves, contract No. 680. George H. Biles is director.

The Board of Education, Catonsville, Md., plans for the installation of manual training equipment in the proposed three-story addition to be erected to the local high school, estimated to cost $250,000. Smith & May, Calvert Building, Baltimore, are architects.

Louis A. States, Gastonia, N. C., engineer, has inquiries out for a 300 to 400 kva. electric generator, 3-phase, 60 cycles; or, as alternate, for a steam engine generator set, with simple or cross-compound condensing engine, Corliss type.

The Greenville Steel & Foundry Co., Greenville, S. C., recently organized, has leased a local building on Markley Street and will remodel and equip for a new works. The company will specialize in the production of fabricated steel products, steel castings, etc. Edward McCrady heads the company.

The quartermaster supply Office, United States Army, Washington, will take bids until April 28 for one electric-operated sump pump, circular 65.

The Georgia Railway & Power Co., Atlanta, Ga., will begin the construction of a new power dam at Yonah Falls, Ga., for hydroelectric development.

The Bickerstaff Brick Co., Columbus, Ga., has inquiries out for a steam shovel, with long boom, traction wheels, about ½ or ¾-yd. capacity.

The Ford Motor Co., Highland Park, Detroit, has asked bids on a general contract for the erection of its proposed assembling plant at Norfolk, Va., to be one story, 300 x 800 ft., with power house, estimated to cost $400,000 with equipment. Albert Kahn, Marquette Building, Detroit, is architect.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids until May 7 for an electric traveling crane for the Charleston, S. C., yard, specification 4962.

The Greensboro Supply Co., Greensboro, N. C., manufacturers' agent, has inquiries out for a 350 to 500-kw. generator, with exciter, switchboard and auxiliary equipment, direct-connected to crude oil engine.

H. C. Deese, Bowdon, Ga., is inquiring for a power drag saw, complete with pulleys, etc., for shingle mill service.

The Norfolk & Western Railway Co., N. & W. Building, Roanoke, Va., J. H. Clemmitt, Room 51, purchasing agent, will take bids until April 30 for 250,000 tie dating nails, contract serial No. AA-301.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until April 29 for 513,000 ft. reinforced steel box straps, for the Boston, Brooklyn and Norfolk navy yards; 200,000 ft. of similar straps for the San Diego, Cal., yard; 25,000 ft. twisted wire box straps for the Norfolk yard; and 50,000 ft. of like straps for the San Diego yard, schedule 2087; also, until May 6, for the Washington yard, 6350 lb. naval brass tubes, schedule 2099.

The Carolina Light & Power Co., Aiken, S. C., has tentative plans for the construction of a hydroelectric power plant at the local Croft mill site, recently acquired, estimated to cost $175,000 with equipment.

The High Point Furniture Co., High Point, N. C., is in the market for a double 60-in. mechanical blower fan and dust collecting system. M. J. Wrenn heads the company.

The quartermaster, Marine Corps, Washington, will take bids until April 29 for 4000 ft. wrought steel pipe and 10 hot water boilers.

The Camp Mfg. Co., Franklin, Va., is in the market for a Corliss engine, 750 to 900 hp., with auxiliary equipment, as well as other machinery for its lumber mill and power house, to replace that recently destroyed by fire with loss of about $300,000 including buildings.

The director of purchases and sales, Department of Agriculture, Washington, will receive bids until April 29 for one 1½-hp. motor, a. c.

The Common Council, Cowpens, S. C., is planning for the installation of electric-operated pumping equipment in connection with its proposed waterworks and sewage plants, estimated to cost $75,000. A special election has been called May 13 to vote bonds.

The United States Engineer Office, Wilmington, N. C., will take bids until May 15 for one 20-in. dredging pump.

Canada

TORONTO, ONT., April 19.

INQUIRIES for machinery and machine tools continue a strong feature of the present market conditions, but despite this fact buying interests are holding purchases chiefly to one or two tools at a time. The small-lot tool demand has been fairly good of late and dealers and builders in Ontario and Quebec report a very satisfactory movement of equipment as a result. While industrial activities have not improved as much as dealers expected earlier in the year, the demand for machinery and tools has been fairly steady, and during the past week several inquiries were received of the variety that usually turn into good sales. Dealers and builders are taking an optimistic view of future prospects. The automotive industry continues to enter the market for machine tools and equipment.

The Canadian National Railways will shortly issue a fair sized list for proposed car shops at St. Thomas, Ont., as well as for tools for replacement purposes at other plants throughout the Dominion.

The Acme Handle Co., Grand Valley, Ont., is in the market for complete equipment and tools for woodworking factory. W. C. Storey is manager.

C. Page, 2180 Notre Dame Street East, Montreal, Que., is in the market for a lathe, drill, etc.

The Canada Wood Specialty Co., Orillia, Ont., has started work on the erection of a factory to cost $75,000. E. Webb & Son are architects in charge.

Bids are being received by engineer R. D. Nye, Sarnia, Ont., for approximately 1000 tons of structural for steel plant to be erected for the Dominion Alloy Steel Corporation, Royal Bank Building, Toronto, Ont. Administration office of company is now in Council Chambers on Indian Reserve at Sarnia, Ont.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.49c.
Swedish charcoal iron bars, base	7.00c.
Soft steel bars, base price	3.49c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.59c.
Channels, angles and tees under 3 in. x ¼ in., base	3.49c.
Steel plates, ¼ in. and heavier	3.59c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.55c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.05c.
Toe-calk, ½ x ⅝ in. and larger	4.50c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	70c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.70c.	.....
Nos. 22 and 24	4.70c. to 4.85c.	5.10c.
No. 26	4.75c. to 4.90c.	5.15c.
No. 28*	4.85c. to 5.00c.	5.25c.
No 30	5.05c. to 5.20c.	.....

Galvanized

	Per Lb.
No. 14	4.95c. to 5.10c.
No. 16	5.10c. to 5.25c.
Nos. 18 and 20	5.25c. to 5.40c.
Nos. 22 and 24	5.40c. to 5.55c.
No. 26	5.55c. to 5.70c.
No. 28*	5.85c. to 6.00c.
No. 30	6.35c. to 6.50c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—41	—24	½ in. Butt...	— 4	+19
¾ in. Butt...	—46	—32	¾ in. Butt...	—11	+ 9
1-3 in. Butt..	—48	—34	1-1½ in. Butt.	—14	+ 6
2½-6 in. Lap.	—44	—30	2 in. Lap.....	— 5	+14
7-8 in. Lap..	—41	—11	2½-6 in. Lap.	— 9	+ 9
9-12 in. Lap..	—34	— 6	7-12 in. Lap..	— 3	+16

Bolts and Screws

Machine bolts, cut thread,
45 and 10 to 45, 10 and 10 per cent off list
Carriage bolts, cut thread,
35 and 10 to 35, 10 and 10 per cent off list
Coach screws, 45 and 10 to 45, 10 and 10 per cent off list
Wood screws, flat head iron,
75, 20 and 10 per cent off list

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c. to 4.75c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¾c. to 18¾c.
High brass wire	18¼c. to 19¼c.
Brass rods	15½c. to 16½c.
Brass tube, brazed	25¾c. to 26¾c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	22¾c. to 23¾c.

Copper Sheets

Sheet copper, hot rolled, 21¼c. to 21¾c. per lb. base.
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14 x 20	
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Prime	Seconds
		80 lb..	$6.55 $6.30
		90 lb..	6.65 6.40
		100 lb..	6.75 6.50
IC..	$11.75 $9.50	IC..	7.00 6.75
IX..	13.25 11.50	IX..	8.25 8.00
IXX..	14.50 12.50	IXX..	9.50 9.25
IXXX..	15.50 13.75	IXXX..	10.75 10.50
IXXXX..	16.50 14.75	IXXXX..	12.00 10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	54c.
Bar	55c. to 60c.

Copper

Lake ingot	16 c.
Electrolytic	15½c.
Casting	14½c.

Spelter and Sheet Zinc

Western spelter	8c.
Sheet zinc, No. 9 base, casks	10¾c. open 11½c.

Lead and Solder*

American pig lead	9¼c. to 9½c.
Bar lead	13c. to 14c.
Solder ½ and ½ guaranteed	40c.
No. 1 solder	38c.
Refined solder	34c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb	25c. to 35c.

Antimony

Asiatic	12c. to 13c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

Demand is slow and values are generally unchanged. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light bottoms	9.00
Brass, heavy	6.50
Brass, light	5.00
Heavy machine composition	8.00
No. 1 yellow brass turnings	6.75
No. 1 red brass or composition turnings	8.25
Lead, heavy	6.25
Lead, tea	4.75
Zinc	4.00
Cast aluminum	15.50
Sheet aluminum	16.00